

I-66 CORRIDOR TRANSIT/TDM STUDY

Inside and Outside the Beltway

Task 1: Data Collection and Inventory Analysis

DECEMBER 30, 2008

Virginia Department of Rail and Public Transportation



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1.0 INTRODUCTION

The Virginia Department of Rail and Public Transportation (DRPT) is initiating the I-66 Corridor Transit Study for the I-66 Corridor from Washington, D.C. to Haymarket, Virginia. The study is being conducted in coordination with local jurisdictions and partnering agencies and will result in recommendations for short-, medium-, and long-term transit/TDM needs in the corridor. The purpose of this study is to examine operational aspects and potential solutions and applications for transit/TDM in conjunction with High Occupancy Vehicle (HOV) and other capital and operational improvements to the I-66 Corridor.

This report documents the first step in the study process for the I-66 Corridor Transit/TDM Study. It provides an inventory of existing and planned transportation programs and services in the I-66 Corridor, documents their performance, and provides an assessment of how well the activity centers in the corridor are served by current transit services. Also provided are summaries of the recommendations from the numerous studies and documents already conducted for the highway and transit facilities in the Corridor. Relevant improvements included in the state, regional, and local plans are also summarized.

1.1 OVERVIEW OF THE I-66 CORRIDOR

The I-66 Corridor extends to the west from Washington, D.C., traversing the highly developed counties of Arlington and Fairfax and the outer suburbs in Prince William County to Frederick and Clarke Counties, where it terminates at I-81 near Strasburg. I-66 provides one of the two interstate highway connections between the nation's capital and points to the west. The other, I-270, is located on the opposite side of the Potomac River in Maryland.

1.1.1 Corridor Definition

The study area for this current transit study extends from Washington, D.C. to U.S. 15 near Haymarket (see Figure 1-1). Major parallel routes include U.S. 29, which runs along I-66 for the length of the study area, and U.S. 50 which runs along I-66 from Rosslyn to the City of Fairfax. Major north-south routes include Route 261 (Dulles Connector Road), Route 7, I-495 (the Beltway), Route 123, Route 7100 (Fairfax County Parkway), Route 28, Route 234, and U.S. 15.

The existing transportation infrastructure is a complex mix of transit and highway facilities and services that are heavily utilized and experience frequent congestion in both the peak and off-peak directions. The highway network includes the full range of roadways from two-lane rural routes established more than 100 years ago to major urban freeways with HOV facilities. Inside the Beltway, I-66 includes four through lanes and is a limited-access facility connecting Washington, D.C. with Arlington and eastern Fairfax County. HOV-2 restrictions (two persons per vehicle) are in effect on both inbound lanes each weekday morning and on both outbound lanes each evening peak period. Within the study area, outside of the Beltway, I-66 ranges from six to eight lanes during non-peak periods. HOV-2 restrictions are in effect for the left lane in the a.m. (inbound) and p.m. (outbound) peak periods. Between the Beltway and U.S. 50, I-66 has six lanes, with shoulder usage in this section providing a third general purpose lane during peak periods. Between U.S. 50 and VA 234, I-66 has eight lanes and four lanes from VA 234 to I-81. Construction of one additional lane and one HOV lane is in progress between VA 234 and U.S. 29.



LEGEND

Metro Orange Line and Stations	VRE Manassas Line and Stations
Interstates	I-66 Corridor Boundary
Major Arterials	

FIGURE 1-1
I-66 Corridor
 I-66 CORRIDOR TRANSIT STUDY
 (INSIDE AND OUTSIDE THE BELTWAY)

Transit investments in the Corridor range from local bus service from small local providers to the fixed guideway, heavy rail operations of the Metro Orange Line. The Orange Line runs from the core of Washington, D.C. to Vienna. Trains traveling to the corridor emerge from a portal located just west of George Mason Drive (Exit 71W) and travel above ground within the median of I-66 to the lines' western terminus at the Vienna/Fairfax-GMU Station. Virginia Railway Express (VRE) operates commuter rail service on the Manassas Line from Union Station in Washington, D.C. to Manassas at the far western end of the Corridor. This service runs along active freight tracks. A variety of bus service is offered throughout the Corridor with a heavy emphasis on feeder services to Metrorail stations and local circulation through neighborhoods. A few commuter bus routes to the core also operate on I-66.

Major bicycle and pedestrian trails within the Corridor include the Washington & Old Dominion and Martha Custis Trails which roughly parallel I-66 inside the Beltway and are, in some cases, located within the interstate's right-of-way.

1.1.2 Summary of Travel Patterns and Demand

Historically, the largest segment of travel in the Washington metropolitan region consisted of work travel between suburban homes and jobs in the urban core, and discretionary trips within suburban residential areas. However, continuing growth in employment and retail development in the Northern Virginia and Maryland suburbs has changed the patterns in which people commute, shop, and travel. Regional travel currently includes a growing number of suburb-to-suburb work trips, core-to-suburb work trips, and discretionary trips to regional entertainment and shopping centers in the suburbs.

This change in travel patterns combined with the substantial amount of growth in the Corridor's population and employment have placed additional strain on what is already an overloaded and heavily congested transportation system. Further, high growth at the western end of the Corridor has occurred in a dispersed pattern of development that is highly auto-oriented, leaving people with few travel choices and resulting in widespread congestion on Corridor roadways.

Demand regularly exceeds the available capacity on most of the major roadways in the Corridor during peak hours. Rail transit services by the Washington Metropolitan Area Transit Authority (WMATA) and VRE are highly successful, but are constrained by station access issues in the middle and outer portions of the corridor and capacity issues closer to the region's core. Feeder bus service to transit stations is well used and current park-and-ride usage at rail stations is near 100 percent. Expansion of bus services has not kept pace with development in the western reaches of the Corridor, and some existing activity centers are not well served. Further, the Metrorail Orange line is forecast to reach capacity by 2025, even if WMATA receives the full funding it needs to operate longer (8-car) trains.

Improving corridor mobility, creating better intermodal connections, and offering new transit services are critical to meeting the transportation needs of residents and employees of the I-66 Corridor.

1.1.3 History of I-66

The history of Interstate 66 begins in 1959 when it was included on the National Interstate Map. Its construction was completed over a period of 20 years. Extra time was required to secure funding for the project, perform the studies necessary to plan the Metrorail Orange Line, and resolve lawsuits. Since that time, numerous improvements and studies have been conducted. A chronology of I-66 is presented in Table 1-1.

TABLE 1-1: I-66 CHRONOLOGY

Year	Event/Activity
1956	<ul style="list-style-type: none"> I-66 (76 miles from I-81 to Washington, D.C.) included on National Interstate Map
1964	<ul style="list-style-type: none"> I-66 4-lane divided freeway between Beltway and Centreville completed
1967	<ul style="list-style-type: none"> State agrees to delay construction inside the Beltway while Metro line in the median was planned
1969	<ul style="list-style-type: none"> First Regional Metrorail System Plan adopted
1970	<ul style="list-style-type: none"> Arlington citizens file lawsuit to block construction, district court dismisses case
1972	<ul style="list-style-type: none"> U.S. Circuit Court in Richmond bars construction until EIS is complete/hearings held
1974	<ul style="list-style-type: none"> Final EIS submitted, proposes 8-lane highway (July)
1975	<ul style="list-style-type: none"> Modified design of 6-lanes rejected
1977	<ul style="list-style-type: none"> “Coleman Decision” approves I-66 inside the Beltway for construction as a 4-lane facility with transit in the median, entire facility to be HOV 4, and no trucks allowed
1979	<ul style="list-style-type: none"> I-66 from U.S. 29 at Gainesville to Fauquier County Line completed
1982	<ul style="list-style-type: none"> I-66 from Roosevelt Bridge to Beltway completed
1983	<ul style="list-style-type: none"> Public Law (PL) 98-205 allows change from HOV 4 to HOV 3 inside the Beltway for one-year trial period
1984	<ul style="list-style-type: none"> Dulles Connector Road linking I-66 with Dulles Airport Access Road completed
1986	<ul style="list-style-type: none"> Metro’s Orange Line to Vienna opens for service
1992	<ul style="list-style-type: none"> Motorcycles permitted to use I-66 HOV lanes
1993	<ul style="list-style-type: none"> Construction of two additional lanes (1 regular and 1 HOV) from Beltway to U.S. 50 completed
1994	<ul style="list-style-type: none"> Section 346 of 1995 Department of Transportation (DOT) Appropriations Act permits change from HOV 3 to HOV 2 inside the Beltway for one-year trial period Construction of two additional lanes (1 regular, 1 HOV) west of U.S. 50 begins
1996	<ul style="list-style-type: none"> Construction of two additional lanes (1 regular, 1 HOV) from U.S. 50 to Manassas completed
1998	<ul style="list-style-type: none"> Hours of operation of variable shoulder lanes between the Beltway and U.S. 50 were extended beyond HOV restriction periods
1999	<ul style="list-style-type: none"> Section 361 of 1999 DOT Appropriations Act (PL 105-277) affects “Coleman Decision” by giving Virginia exclusive authority to determine HOV restrictions; use of Dulles Connector by vehicles going to / from Airport not affected Congressman Wolf recommends westbound widening (to 3 lanes) from Spout Run Parkway to the Beltway Arlington (Mr. Ferguson) asks VDOT to study additional westbound access points inside the Beltway I-66 Major Investment Study (Outside the Beltway) completed Governor Gilmore announces plan to widen I-66 in both directions
2001	<ul style="list-style-type: none"> Virginia General Assembly passes Senate Joint Resolution 411 to study widening of I-66 between the Theodore Roosevelt Bridge and the Beltway Transportation Planning Board (TPB) adds Inside the Beltway study to FY02 Transportation Improvement Program (TIP) conformity input ; TPB then amends the FY01 TIP to expedite study initiation Multimodal Transportation and Environmental Study (Outside the Beltway) initiated to further findings of Major Investment Study that was completed in 1999

TABLE 1-1: I-66 CHRONOLOGY

Year	Event/Activity
2003	<ul style="list-style-type: none"> ▪ Multimodal Transportation and Environmental Study (Outside the Beltway) put on hold indefinitely ▪ Inside the Beltway Study deleted from VDOT STYP and TPB TIP ▪ Letter from Congressmen Wolf and Davis to Governor Warner requesting an additional lane on I-66 westbound from the Rosslyn Tunnel to the Dulles Airport Access Road
2004	<ul style="list-style-type: none"> ▪ Federal earmark for I-66 study allocated by Federal Highway Administration ▪ Idea 66 Study initiated ▪ TIP amendment for study submitted to TPB and discussed at Northern Virginia Transportation Authority (NVTA) ▪ Commissioner Shucet writes to Congressmen outlining study timeline
2005	<ul style="list-style-type: none"> ▪ Idea 66 Study concludes with recommendation of Spot Improvements and possible additional westbound lane inside the Beltway
2006	<ul style="list-style-type: none"> ▪ Construction of two additional lanes (1 regular, 1 HOV) from Route 234 Business to Route 234 Bypass completed
2007	<ul style="list-style-type: none"> ▪ Construction of two additional lanes (1 regular, 1 HOV) from Route 234 Bypass and U.S. 29 begins
2008	<ul style="list-style-type: none"> ▪ "Spot Improvements" to I-66 inside the Beltway included in FY 2008-2013 TIP ▪ I-66 Corridor Transit Study (Inside and Outside the Beltway) initiated

2.0 PLANNING CONTEXT

Many studies and plans have been developed to address the transportation challenges in the I-66 Corridor. Of particular note is that none of these studies has considered the full length of the I-66 Corridor within the Washington Metropolitan region, instead addressing either the area of I-66 “Inside the Beltway” or the area “Outside the Beltway”. This is primarily the result of the Coleman Decision of 1977, which approved the construction of I-66 inside the Beltway and set limitations on the number of lanes, banning of truck traffic, and adoption of high occupancy vehicle (HOV) requirements. This decision was overturned in 1999 when Congress passed the 1999 Department of Transportation Appropriations Act (PL 105-277) and gave Virginia exclusive authority over decisions regarding I-66 inside the Beltway.

2.1 PREVIOUS I-66 CORRIDOR STUDIES

Table 2-1 identifies and briefly describes earlier multi-modal studies of the I-66 Corridor. Only one study has been conducted for the portion of I-66 Inside the Beltway.

TABLE 2-1: PREVIOUS I-66 CORRIDOR STUDIES

Study/Plan	Description and Recommendations
I-66 Major Investment Study (VDOT/DRPT, 1999)	<p>VDOT and DRPT concluded the Major Investment Study (MIS) for I-66 outside the Beltway in 1999. The study area included a 24-mile segment of the I-66 Corridor between the Beltway and U.S. 15. A combination of transit and highway system improvements was considered. The Recommended Transportation Investment Strategy included the following:</p> <ul style="list-style-type: none">▪ Extension of Metrorail from the Vienna terminus to Centreville with stations spaced approximately every two miles at Chain Bridge Road (Route 123), Fair Oaks Mall/Government Center, Stringfellow Road, and Centreville;▪ Two-lane, reversible, barrier-separated HOV facility from just west of the I-66 Interchange with the Beltway to the proposed Tri-County Parkway;▪ One additional general purpose lane in each direction between the Beltway and U.S. 50 as well as a full-width shoulder; and▪ Expanded peak period bus transit and as well as off-peak services; skip stop service on Virginia Railway Express (VRE), and shorter headways (3 min.) between Metro trains at the Vienna/Fairfax-GMU Station.
I-66 Multimodal Transportation and Environment Study (VDOT/DRPT, 2003) See Appendix A for further detail regarding the BRT alternatives studied and Metrorail station location evaluations.	<p>VDOT and DRPT jointly began this study in 2001. The purpose of the study was to continue the planning process for the improvements recommended at the conclusion of the I-66 MIS in 1999. More detailed studies in support of the Draft EIS for the BRT alternatives and Metrorail station locations were in progress when the study was terminated in 2003. A Purpose and Need Report and Technical Memorandum on Existing Transportation Conditions Analysis were published in February 2003.</p>

TABLE 2-1: PREVIOUS I-66 CORRIDOR STUDIES

Study/Plan	Description and Recommendations
Idea-66: I-66 Inside the Beltway Feasibility Study (VDOT/FHWA, 2005).	<p>VDOT in cooperation with the Federal Highway Administration (FHWA) conducted a feasibility study of the I-66 westbound corridor between Rosslyn and the Dulles Airport Access Highway. The study reviewed various options for transportation improvements such as transit, roadway widening, and HOV/High Occupancy Toll (HOT) Lanes.</p> <p>Based on study findings, it was recommended that the roadway widening concept with various managed lane types and advanced system management techniques be advanced for more detailed evaluation as part of a Location Study in accordance with VDOT guidelines and the National Environmental Policy Act (NEPA).</p> <p>Interim improvements with minimal impacts were also recommended to address “spot” problems and geometric deficiencies. The following “spot” improvements have been programmed as part of the Region’s Transportation Improvement Plan (TIP) for FY2008-2013:</p> <ul style="list-style-type: none"> ▪ Extension of westbound acceleration lane from Fairfax Drive to Sycamore Street, from 2 to 3 lanes. (1.5 miles); ▪ Extension of westbound acceleration lane from Washington Blvd. to the Dulles Airport Access Highway, from 3 to 4 lanes. (1.6 miles); and ▪ Extension of westbound acceleration lane from Lee Highway/Spout Run to Glebe Road, from 2 to 3 lanes. (1 mile).

2.2 FUTURE PLANS

Several local and regional plans identify highway and transit investments in the I-66 Corridor as elements of the future transportation network that are essential to meeting future transportation and development goals. These plans encompass regional plans and initiatives as well as local transportation and comprehensive plans.

2.2.1 Regional Plans and Initiatives

A number of overlapping planning agencies have worked across jurisdictional boundaries to develop plans that include the Northern Virginia region. This section summarizes the transportation elements of those plans.

A. MWCOG Constrained Long Range Plan

As the Metropolitan Planning Organization (MPO) for the Washington D.C. region, the Metropolitan Washington Council of Governments (MWCOG) oversees the preparation of a long-range transportation plan that is both fiscally constrained and meets air quality conformity requirements.

In coordination with the MWCOG, the National Capital Region Transportation Planning Board (TPB) develops the constrained long-range plan (CLRP) and the Transportation Improvement Program (TIP) for the region. They include projects that are designed to ensure environmental quality and maintain the regional transportation system. All planned projects or studies included in the CLRP are those for which funds are “reasonably expected to be available.” Highway, transit, and pedestrian/bicycle projects, as well as regional transportation studies, are included. The TIP translates the CLRP into a program of action for the current six-year period.

The current (approved) TIP is the 2007 Plan, which covers FY2008-2013. On June 12, 2008 the TPB released the Draft 2008 CLRP, Draft FY 2009-2014 TIP and the accompanying Air Quality Conformity Analysis for public comment. The 30-day public comment period ends on July 12, 2008. Major programmed improvements concerning the I-66 Corridor include:

- Construct I-66 Transit Ramps to provide access to Vienna/Fairfax-GMU Station via Vaden Drive;
- Extend Metrorail to Wiehle Avenue – Phase 1;
- Extend Metrorail to Loudoun County – Phase 2;
- VRE Stations and Facilities Upgrades (Platform construction at Burke Centre and Broad Run Center on VRE Manassas Line, addition of 1,100 parking spaces at Burke Center Station);
- VRE Gainesville to Haymarket Extension (study only);
- Metro Matters Eight Car Train Capital Initiative;
- Falls Church Intermodal Transportation Facility;
- Construct Park and Ride Lot at I-66 and Route 234;
- Add westbound auxiliary lanes on I-66 (from Fairfax Drive to Sycamore Street; from Washington Blvd. to the Dulles Airport Access Highway; and from Lee Hwy/Spout Run to Glebe Road);
- Widen U.S. 29 to six lanes between I-495 and the western limit of City of Fairfax and in two segments between Route 28 and U.S. 15;
- Reconstruct I-66 interchanges with U.S. 15;
- Widen segments of U.S. 50 between the Potomac River and the City of Fairfax to six lanes;
- Upgrade 14 miles of Route 28 to 8-lanes with 10 interchanges between I-66 and Route 7.
- Widen Fairfax County Parkway to 6-lanes (to include one addition HOV lane in each direction);
- Construct Tri-County Parkway (new 4- to 6-lane roadway) from Route 234/Goodwin Drive to I-66;
- Widen I-66 to 8-lanes (to include one HOV lane in each direction) between Route 234 and U.S. 29; widen to 6-lanes between Manassas Park to U.S. 29/Route 28 intersection.
- Reconstruct I-66 interchanges with U.S. 29
- Widen U.S. 15 to 4-lanes in Prince William County.

B. VDOT's Six-Year Improvement Plan

The DRPT and VDOT Six-Year Improvement Program (SYIP) allocates funds for transportation projects proposed for construction, development or study in the next six fiscal years. The current SYIP, covering fiscal years 2009-2014, required the delay or cancellation of a number of projects due to the anticipated reduction in revenues resulting from the slowing economy. The SYIP for the Northern Virginia region is developed in conjunction with the CLRP and TIP.

C. NVTa's TransAction 2030 Plan

The Virginia General Assembly created the Northern Virginia Transportation Authority on July 1, 2002 and charged it with development of a long-range transportation plan for the Northern Virginia region. The TransAction 2030 Plan used a corridor-based approach, treating I-66,

U.S. 29 and U.S. 50 (east of I-66) as a single corridor. The plan used the CLRP as a starting point with additional improvements proposed as determined appropriate. The improvements identified in this plan exceed the CLRP programmed improvements by more than \$15 billion. Improvements related to the I-66 Corridor include:

- Widen I-66 to 10 lanes, including two reversible HOV lanes between I-495 and U.S. 29 in Gainesville;
- Widen U.S. 29 to six lanes from Route 7 to the Fauquier County Line;
- Reconstruct I-66 interchanges at Nutley Street, Route 123, U.S. 50, Stringfellow Road (new interchange), Route 28, and U.S. 29;
- Extend Metrorail to Centreville;
- Extend VRE from Manassas to Haymarket;
- Additional parking at VRE stations along the Manassas Line; and
- Initiate express bus service in the I-66 and U.S. 50 corridors.

D. WMATA 10-Year Capital Improvement Plan (CIP)

In 2002 WMATA released a 10-Year Capital Improvement Program (CIP) to provide a blueprint for maintaining the existing system in a state of good repair, improving service to meet existing needs within the region, and expanding the fixed-guideway system to reach new markets. In total, the plan identified \$12.2 billion in system improvements. Not all of the improvements identified have received funding or are currently programmed for funding.

WMATA is currently in the process of updating the CIP; a new plan is anticipated in mid-2008. Improvements relative to transit operations in the I-66 Corridor include:

- Expansion of the rail car fleet to allow WMATA to run 8-car trains during peak hours and expand the capacity of the Rosslyn tunnel by 36 percent;
- Addition of 620 buses to improve existing route service and create new Express Direct routes, including:
 - Fairfax Government Center to Union Station,
 - Vienna/Fairfax-GMU to Crystal City,
 - Reston/Herndon to Union Station, and
 - West Falls Church-VT/UVA Station to Union Station;
- Extension of Metrorail service in the I-66 Corridor from Vienna Station to Centreville; and
- Extension of new fixed guideway service (Metrorail has since been selected for implementation) in the Dulles Corridor, connecting to the Orange Line at East Falls Church.

E. Virginia Railway Express Strategic Plan

The VRE Strategic Plan was developed to guide the growth of the VRE system. The plan includes ridership projections, service planning, capital cost estimates, and implementation and funding strategies. The near term priorities include:

- Development of the core network to build capacity in parking, station facilities and railroad infrastructure;
- Improve service and expand coverage within the existing VRE territory; and
- Seek development partnerships for funding that allow growth beyond current boundaries.

The plan identifies service to Haymarket as a priority to be implemented in stages starting with an 8-mile extension to Gainesville followed by a 3-mile extension to Haymarket. Additional details are available in the Virginia Railway Express Gainesville-Haymarket Extension Implementation Plan.

2.2.2 Local Comprehensive and Transportation Plans

Governing bodies in Virginia are required to adopt comprehensive plans for their jurisdiction and update or re-approve them at least every five years. These plans and the highway and transit improvements proposed in the I-66 Corridor are summarized below.

A. Arlington County Comprehensive Plan

The Arlington County Comprehensive Plan is comprised of nine elements, each addressing a specific issue. Besides the Master Transportation Plan, described below, and the General Land Use Plan, described in Section 3.3.2, separate plans exist for stormwater, water distribution, sewers, recycling programs, Chesapeake Bay preservation, public spaces, and historic preservation. The goals, strategies, and policies of the Master Transportation Plan focus on coordinating transportation and land use to manage travel demand, supporting alternative modes of travel, and maintaining a high quality of life, with an emphasis on “complete streets.”

The plan is divided by mode (streets, transit, pedestrians, bicycles, parking, and transportation demand and system management) with a set of policies for each. While the streets component of the plan focuses on arterial and neighborhood streets, it briefly describes the County’s vision for I-66 within its borders, which includes:

- Use of spot improvements and TSM measures at interchanges;
- Reversion to HOV-3 for the peak period to maximize person throughput without adding lanes;
- More frequent bus service; and
- Preservation of right-of-way for additional rail lines.

In addition to the recommendations for improvements to transit services within the County, the transit component emphasizes the peak-hour crowding on Metrorail and encourages:

- Running 8-car trains on the Orange Line;
- Constructing an additional rail tunnel between Rosslyn and Georgetown;
- Express bus service between the East Falls Church Metrorail Station and Washington, D.C. via I-66; and
- Express bus service between Fairfax City/Seven Corners and Washington, D.C. via Arlington Boulevard/U.S. 50.

B. Fairfax County Comprehensive Plan

The Fairfax County Comprehensive Plan has three components: the Policy Plan, Area Plans, and the Comprehensive Plan Map. The Policy Plan explains the county's goals, objectives, and policies regarding land use, transportation, housing, environment, and other planning areas. The Area Plans are site-specific, and are divided into Planning Districts, Community Planning Sectors, and special areas, such as the Fairfax Center Area and several Suburban Centers. The third component, the Comprehensive Plan Map, is a generalized depiction of the pattern of future land use, transportation, public facilities, and other planned features.

The transportation component of the Policy Plan includes 13 objectives that address both inter- and intra-County transportation needs and encourage public transportation, high occupancy vehicle lanes, and other transportation demand measures, while allowing for the expansion of the existing roadway network in a manner that is coordinated with County land use goals and minimizes community and environmental impacts.

The plan has identified I-66 as an “Enhanced Public Transportation Corridor” where major transit services will be provided in high-volume corridors. The Fairfax County Plan calls for the following improvements:

- Extension of Metrorail from the Vienna Station to Prince William County, with three to four stations each with large park-and-ride lots;
- Widening I-66 between I-495 (Capital Beltway) and Prince William County to 10 lanes and maintaining the existing HOV facility;
- Improvements to I-66 interchanges at I-495, U.S. 50, Route 28, and U.S. 29, and to access ramps to the Vienna Metrorail Station, and
- Adding a new I-66 interchange at Stringfellow Road and the proposed extension of the Route 28 Bypass.

The two primary parallel routes to I-66, U.S. 29 and U.S. 50 are both recommended for improvements as well, with the plan calling for widening each to six travel lanes throughout the County and adding a number of new interchanges.

C. City of Fairfax Comprehensive Plan

With its location adjacent to I-66 and because it is bisected by both U.S. 29 and U.S. 50, the City of Fairfax’s Comprehensive Plan places an emphasis on minimizing the adverse impacts of through-traffic. The City supports the westward extension of Metrorail, although it opposes the construction of a station at Chain Bridge Road. The plan notes that to prevent the creation of a bottleneck, the City should widen U.S. 29 and U.S. 50 within its borders to six lanes when the adjacent segments are widened, as called for in the Fairfax County plan.

D. Prince William County Comprehensive Plan

The update to the 2007 Prince William County Comprehensive Plan, published in March 2008, divides the county into “Development Areas” and “Rural Areas”, with development focused along the I-66 and I-95 corridors. The transportation element of the plan calls for widening I-66 to eight lanes with an HOV lane in each direction from Fauquier County to Fairfax County and for a reconfiguration of the interchange at U.S. 29. The plan also calls for widening U.S. 29 to six lanes and adding an interchange at U.S. 15.

To support transit and carpooling, the plan recommends new commuter parking lots near the I-66 interchanges with U.S. 29 and U.S. 15. The Comprehensive Plan also includes a Transit Improvement Plan, which designates bus routes, commuter rail stations, park-and-ride lots, and transit centers, for both current and planned services and infrastructure, as designated by the Potomac and Rappahannock Transportation Commission.

E. Potomac and Rappahannock Transportation Commission Long Range Bus Service Plan

The Potomac and Rappahannock Transportation Commission developed a Long Range Bus Service Plan in 2007 to facilitate continuing transit ridership growth and service expansion. The Long Range Bus Plan impacts the corridor by incorporating new bus routes, such as the

Gainesville Haymarket Dulles OmniRide and the Manassas Dulles OmniRide routes, as well as modifying several existing bus routes which are in the corridor.

2.3 RELATED STUDIES

Table 2-2 identifies studies related to the I-66 Corridor Transit/TDM Study, includes brief descriptions, and identifies the significance and/or relationship to the I-66 Corridor Transit/TDM Study.

TABLE 2-2: RELATED STUDIES

Study/Plan	Description and Recommendations	Significance and/or Relationship
Transit Studies		
<i>Fairfax Connector Transit Development Plan (Fairfax County, ongoing)</i>	Fairfax County is developing a 10-year bus service plan for both Connector and Metrobus. The study will include analysis of current and projected demographics, economics and land uses; customer surveys; and ridership counts.	Service recommendations from the plan will be considered in the I-66 Corridor Transit Study when available. Future study activities and analyses will be coordinated with Fairfax County.
<i>Fairfax Corner Metro Station Entry Pavilion Study (2008)</i>	This study determined an approximate entry location for the future Metrorail Station at I-66 and U.S. 50.	The addition of the new Metrorail Station, if programmed, would be considered in future analyses.
<i>Transit Plan (Prince William County, 2008)</i>	The intent of the plan is to develop a sustainable transit policy comprised of policies addressing transit supportive development and land use, multiple transit systems and services, travel demand management, and parking policies that collectively creates a more efficient and coordinated transportation and transit network.	Provides official designation to the identified I-66/U.S. 29 corridor as a transit corridor and puts forward goals, policies, and action strategies.
<i>Vaden Drive Ramp Feasibility Study (ongoing)</i>	In conjunction with the Vienna Station Access Study, the Feasibility Study is examining transit ramps to and from the I-66 HOV lanes connecting to the Vaden Drive Bridge, adjacent to the Vienna Metrorail Station and is now underway.	These ramps would increase access to the Vienna Metrorail Station from the I-66 HOV lanes and could be considered for future analyses.
<i>Dulles Corridor Metrorail Project (MWAA, ongoing)</i>	The Metropolitan Washington Airports Authority (MWAA) in cooperation with the Virginia Department of Rail and Public Transportation (DRPT), Washington Metropolitan Area Transit Authority (WMATA), and Fairfax and Loudoun counties, is working toward the construction of a 23.1-mile extension of Metrorail in the rapidly growing Dulles Corridor through Fairfax and Loudoun counties, Virginia. FTA approved the advancement of the first phase of the project, extension of Metrorail to Wiehle Avenue, into Final Design in May 2008.	Implementation of service on the Dulles line will affect operations on the Orange line and the West Falls Church Station: <ul style="list-style-type: none"> ▪ Passenger loads on the Vienna line will initially increase as service is initiated to Wiehle Avenue. ▪ Service frequencies in the off-peak period will improve east of East Falls Church (providing a 6 minute headway rather than 12 minutes outbound of Rosslyn and a 4 minute headway rather

TABLE 2-2: RELATED STUDIES

Study/Plan	Description and Recommendations	Significance and/or Relationship
		<p>than a 6 minute headway in the core).</p> <p>Peak period service at West Falls Church-VT/UVA will decline because the Dulles line will replace the existing service to Stadium-Armory service as well as bypass the West Falls Church-VT/UVA Station.</p>
<i>Metrorail Station Access and Capacity Study (WMATA, 2008)</i>	<p>The purpose of the study was to analyze station and line capacity issues, recommend improvements to support the predicted growth in ridership and existing issues, and identify areas for further study.</p> <p>The study identifies a list of seven highest priority capital improvements for existing stations and provides forecasts of capacity issues.</p>	<p>In terms of passenger load per car, without additional railcars beyond what is currently funded, the entire Metrorail system will approach capacity by 2030. Currently, 50 percent of the needed 8-car trains are funded.</p> <p>The Orange and Silver (Dulles) lines between Courthouse and Rosslyn are expected to exceed capacity by 2020, exacerbating the already crowded conditions during the peak hour. Growth on the Orange Line and opening of the Silver (Dulles) line will result in a significant increase in the total load inside Arlington.</p> <p>If 100% of the 8-car trains needed are funded, the capacity of the Orange line would be extended by about 5 years.</p>
<i>Vienna Station Access Study (WMATA, 2006)</i>	At the request of Fairfax County, WMATA conducted a parking, station capacity and access analysis in conjunction with a proposed third park-and-ride structure at this location.	The addition of a new parking structure at the Vienna/Fairfax-GMU station, if programmed, will be considered in future analyses. Future study activities will be coordinated with WMATA and Fairfax County.
<i>Regional Bus Study (WMATA, Initial Study – 2003)</i>	<p>The initial two-year study analyzed both Metrobus and bus services operated by local jurisdictions. It assessed the bus service needs of the region. The proposed improvements of the study include extended service hours, neighborhood circulators, and improved transit centers with up-to-the-minute information.</p> <p>Additional improvements to improve trip times are proposed including signal priority, bus only lanes, and RapidBus</p>	Some of the recommendations of this study will integrated into the baseline and no-build alternatives for the I-66 Corridor Transit Study.

TABLE 2-2: RELATED STUDIES

Study/Plan	Description and Recommendations	Significance and/or Relationship
	(Bus Rapid Transit) service. The Phase 2 study completed a more detailed analysis of four transit corridors.	
<p><i>Regional Bus Study – Phase 2: Implementation Plans (2004)</i></p> <p><i>Metro Support Services for the Orange Line</i></p>	<p>The Regional Bus Study – Phase 2 included feasibility studies on several types of improvements including Metro Support Services to provide relief of over crowding on the Orange Line.</p> <p>Providing additional transit capacity in the form of park-and-ride lot express buses running parallel to the Orange Line directly into downtown Washington and/or the Pentagon/Crystal City were studied.</p> <p>The new services were to be operated on highway HOV lanes and some downtown circulation service would be provided by the express buses.</p> <p>A total of six routes were identified:</p> <ul style="list-style-type: none"> ▪ Herndon-Monroe Park-and-Ride to Downtown ▪ West Falls Church-VT/UVA Station to Downtown ▪ Fairfax Government Center Park-and-Ride to Pentagon City/Crystal City ▪ Fairfax Government Center Park-and-Ride to Downtown ▪ Poplar Tree Park-and-Ride to Downtown <p>The study estimated that the six routes would attract approximately 4,600 daily riders with approximately 3,700 riders diverted from the Orange Line and approximately 900 new riders.</p> <p>A diversion of 3,700 trips in the peak period translates to approximately 31 rail cars (five 6-car trains) of capacity relief.</p>	<p>The study concluded that if all Metro Support services and routes were implemented 3,700 trips (which translates to five 6-car trains of capacity) would be shifted from Metrorail to Express Bus.</p> <p>This study showed that Express Bus service offers real potential for capacity relief along the Orange Line.</p>
<p><i>MetroMatters (WMATA, 2003)</i></p>	<p>Metro Matters is a public outreach campaign launched by WMATA in 2003 to inform of the public of the urgent funding needs to maintain operations of the Metro system. WMATA seeks funding through federal sources and local cities and counties for the unfunded urgent priorities in the Six Year Program including maintenance of the existing infrastructure, additional buses and trains, and needed security measures.</p>	<p>Metro Matters recommends the implementation of all 8-car trains to meet capacity needs of the system over the next 20 years.</p>

TABLE 2-2: RELATED STUDIES

Study/Plan	Description and Recommendations	Significance and/or Relationship
<i>WMATA Core Capacity Study (WMATA, 2001)</i>	<p>This study examined the capacity of the existing Metrorail system relative to projected ridership growth. Recommendations of this study included:</p> <ul style="list-style-type: none"> ▪ Implementing 8-car train operations increased from 4- and 6-car train operations ▪ Increasing access to the Metro through feeder bus services, pedestrian and bicycle access improvements, and added parking at stations and park-and-ride lots ▪ Enhancement of core stations to prevent overcrowding <p>Additional line connections between the Orange and Blue line at Rosslyn and the Blue and Yellow line at the Pentagon.</p>	Some of the recommendations of this study will be integrated into the baseline and no-build alternatives for the I-66 Corridor Transit Study.
<i>WMATA Transit Service Expansion Plan (WMATA, 1999)</i>	This study proposed a long-term program of projects including expanded bus services and expansion of rail lines. The plan was intended to guide decisions of WMATA's funding partners. It served as the basis for the System Expansion Plan included in the 10-year Capital Improvement Program for the Metro.	Some of the recommendations of this study will be integrated into the baseline and no-build alternatives for the I-66 Corridor Transit Study.
Highway Studies		
<i>Theodore Roosevelt Memorial Bridge Project (District DOT, 2003)</i>	The study included design and environmental services for improvements to the Roosevelt Bridge, located at the convergence of three major roadways; I-66, George Washington Parkway, and Arlington Blvd (U.S. 50). Proposed improvements include dedicated bus transit lanes, increased vehicular capacity and pedestrian and bike connections.	The possibility of dedicated bus lanes on the Roosevelt Bridge will have an effect on travel patterns and transit demand in the I-66 Corridor. Future study activities regarding programmed improvements will be coordinated with District DOT.
<i>Capital Beltway Study (VDOT, ongoing)</i>	A Record of Decision for this project was completed by the Federal Highway Administration in 2006. Two reevaluations for minor design changes have been completed since that time. The preferred alternative includes four general purpose lanes and two HOV/HOT (High Occupancy Vehicle/High Occupancy Toll) lanes in each direction with interchange improvements at Braddock Road, Little River Turnpike, Gallows Road, Arlington Blvd., I-66, Leesburg Pike, Chain Bridge Road, Dulles	The design of the I-495/I-66 Interchange will greatly influence travel patterns and demand in the I-66 Corridor. Future study analyses will be coordinated with VDOT to ensure the current interchange design is taken into account.

TABLE 2-2: RELATED STUDIES

Study/Plan	Description and Recommendations	Significance and/or Relationship
	Access/Toll Road, and Georgetown Pike.	
<i>VDOT Park-and-Ride Study (VDOT, 2003)</i>	<p>VDOT conducted a study of park-and-ride facilities to identify and address existing and future needs for park-and-ride facilities intended to support HOV facilities.</p> <p>The study considered five highway corridors and seven subareas where additional capacity was determined to be needed in the future, including Centreville and Gainesville in the I-66 Corridor.</p> <p>The study estimated that demand for park-and-ride capacity in the I-66 Corridor subareas (Fairfax, Centreville, Manassas, and Gainesville) would increase by 45 percent between 2001 and 2020 and that approximately 250 additional park-and-ride spaces would be needed.</p> <p>The report identified two potential locations for future park-and-ride lots: (1) a 530-space lot in the southeast quadrant of the I-66/Route 234 Bypass interchange in Manassas, and (2) a 402-space lot in the southwest quadrant of the future Linton Hall Road and U.S. 29 interchange.</p>	A new park-and-ride lot located in the vicinity of the I-66/Route 234 Interchange (with 100-200 spaces) was included in the FY2009-2015 TIP.

3.0 SOCIOECONOMICS AND LAND USE

Population, housing, and employment in the I-66 Corridor have grown at a dramatic pace over the last 25 years and these growth trends are predicted to continue in the western portion of the Corridor over the next 25 years. As a result of this growth, major changes in land use and the form of development have occurred. These changes are the most pronounced along the Metrorail Orange Line which parallels I-66 through Arlington County and a portion of Fairfax County. Further discussion of population, employment and land use is included below.

3.1 POPULATION AND EMPLOYMENT

The Washington, D.C. region and Northern Virginia have grown dramatically over the last several decades and are projected to continue that pattern over the next several. The 1980 regional population of just over three million people grew to five million in 2005 and is projected at more than 6.5 million in 2030. Employment is projected to follow a similar trend, growing to 4.2 million by 2030 (MWCOG, 2007).

Between 2002 and 2006 Northern Virginia's population grew 8.9 percent compared with 6.1 percent growth for the Washington Metropolitan region. Prince William County was second only to Loudoun County in population growth in the region, adding 62,000 jobs and growing by 20 percent. Arlington and Fairfax Counties had more modest growth of 4.0 percent and 1.7 percent, respectively, but still added more than 24,000 people (MWCOG, 2007).

Northern Virginia also led the way in employment growth over the period, growing by 11.1 percent, compared to 6.5 percent for the region. With an increase of 20.9 percent, Prince William County was again second only to Loudoun in terms of rate of growth. In terms of absolute growth, Fairfax County added 46,000 jobs, more than any other jurisdiction and more than all the Maryland suburbs combined. More than half of the employment growth throughout the region was in the "Professional and Business Services" category (MWCOG, 2007).

MWCOG forecasts for the region indicate strong growth in both population and employment over the next 25 years. The three largest jurisdictions in the corridor – Arlington, Fairfax, and Prince William counties – are projected to add more than a half million people combined, with Prince William County expected to grow by nearly 60 percent. Employment is also expected to grow – by more than 40 percent – with more than 240,000 jobs added in Fairfax County. Arlington County, which has experienced more modest increases in employment in recent years, is expected to add more than 60,000 jobs over the next 25 years.

Table 3-1 presents population and employment data by jurisdiction within the I-66 Corridor as well as for Northern Virginia and the region as whole.

TABLE 3-1: POPULATION AND EMPLOYMENT IN THE I-66 CORRIDOR

Jurisdiction	Year		Change	
	2005	2030	Number	Percentage
Population (in thousands)				
Arlington County	199.3	242.5	43.2	21.7%
City of Falls Church	10.6	15.4	4.8	45.3%
Fairfax County	1,043.7	1,334.0	290.3	27.8%
City of Fairfax	22.1	26.5	4.4	19.9%
Prince William County	349.4	555	205.6	58.8%
City of Manassas	37.6	41.9	4.3	11.4%
City of Manassas Park	12.9	16.8	3.9	30.2%
Northern Virginia	2,176.5	3,082.6	906.1	41.6%
Regional Total	4,986.9	6,579.8	1592.9	31.9%
Employment (in thousands)				
Arlington County	194.9	258.4	63.5	32.6%
City of Falls Church	9.5	20.3	10.8	113.7%
Fairfax County	604.0	847.6	243.6	40.3%
City of Fairfax	29.2	39.3	10.1	34.6%
Prince William County	111.6	186	74.4	66.7%
City of Manassas	23.3	26.8	3.5	15.0%
City of Manassas Park	3.0	4.9	1.9	63.3%
Northern Virginia	1,249.8	1,883.5	633.7	50.7%
Regional Total	3,051.0	4,225.3	1174.3	38.5%

Source: MWCOG Round 7.1 Cooperative Forecasts, as presented in *Growth Trends to 2030: Cooperative Forecasting in the Washington Region*, Fall 2007.

3.2 GROWTH PATTERNS

As described above, the rapid growth of the last two decades is expected to continue, with regional population growth of 32 percent and employment growth of 39 percent over the next 25 years. More than half of these new residents and jobs are expected to locate in Northern Virginia with more than 900,000 new residents and more than 600,000 new jobs.

The table above shows projected growth in population for jurisdictions in the I-66 Corridor and the Northern Virginia region. Fairfax and Prince William Counties are expected to add nearly a half million people over this period. Other smaller jurisdictions in the corridor are also projected to grow substantially, growing by more than 20 percent in most cases, adding an additional 60,000 residents.

As at the regional level, the employment growth rate is projected to outpace the population growth rate, with an estimated 51 percent increase in jobs in Northern Virginia. Again the I-66 Corridor jurisdictions represent a majority of this growth.

While population growth will occur primarily in the outer reaches of the Corridor in western Fairfax County and in Prince William County, employment growth is expected to focus in Fairfax

and other closer in jurisdictions. Fairfax County, Arlington County, and the Cities of Falls Church and Fairfax are projected to add more than 325,000 jobs, with the majority of those located in Fairfax County. According to MWCOG projections, employment growth in Northern Virginia will be focused along existing transportation corridors including I-66, I-95, the Dulles Toll Road, and Route 28 (near Dulles Airport).

3.3 LAND USE

Major activity centers, land use controls, and comprehensive planning are described below.

3.3.1 Major Activity Centers

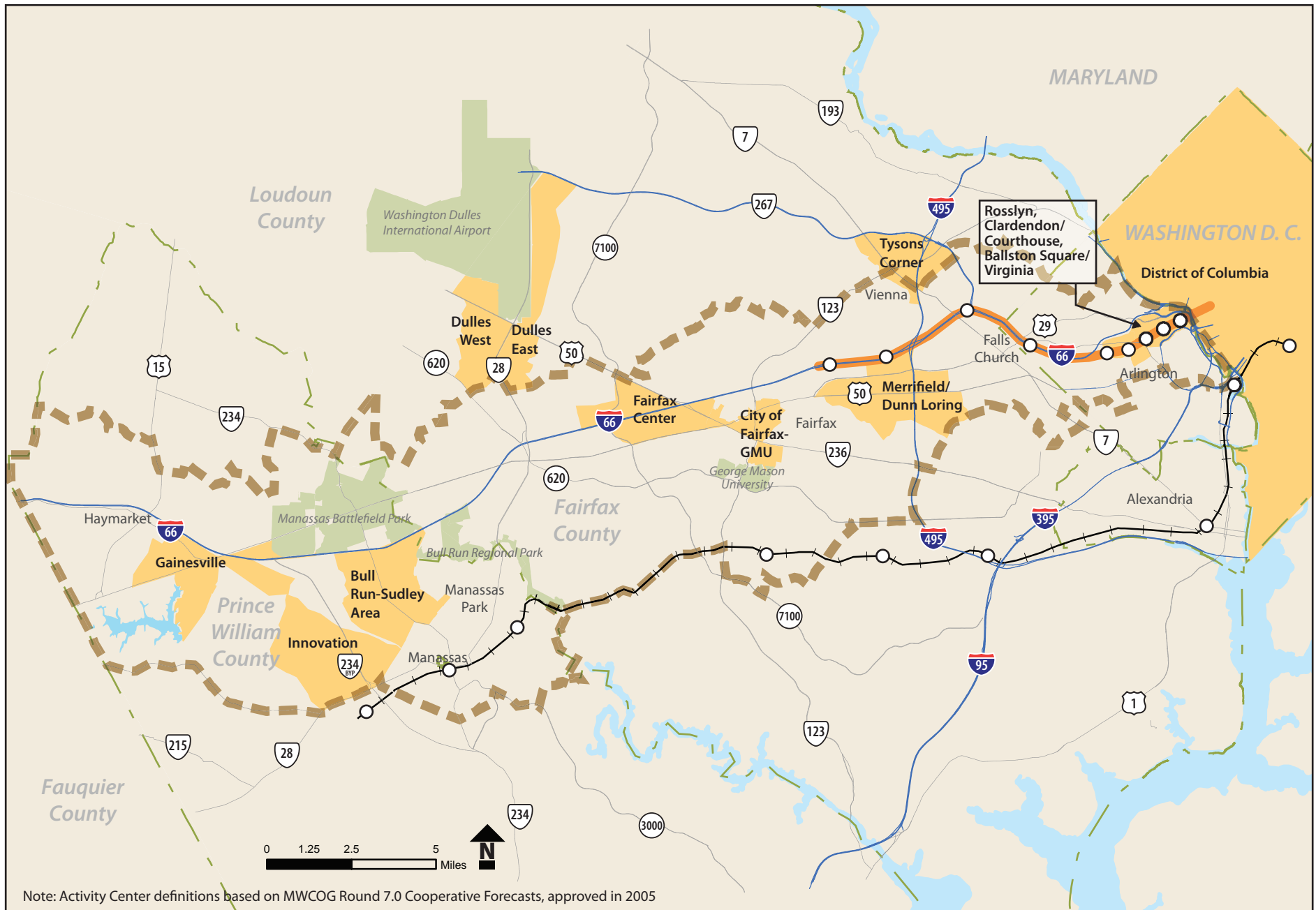
Beginning in 1999 MWCOG has, with each update to the regional forecasts, identified Regional Activity Centers, where local comprehensive plans and zoning call for a concentration of commercial or mixed use development. The Regional Activity Centers in the I-66 Corridor are shown in Figure 3-1 and described below. Their definitions are based on the MWCOG Round 7.0 Cooperative Forecasts, approved in 2005.

A. Mixed Use Centers – Arlington County

The Rosslyn-Ballston Corridor is centered along the Metrorail Orange Line and includes three Mixed Use Centers: Rosslyn, Clarendon/Court House, and Ballston/Virginia Square. Mixed Use Centers contain either a dense mix of retail, employment, and residential activity or significant levels of employment and housing.

Rosslyn currently has the highest employment density (91.7 jobs/acre) outside of Downtown Washington and the highest residential density (33.4 households/acre) in the entire region. With an expected rise in job density of 53 percent and residential density of 71 percent, this area would remain one of the densest areas in the region. Currently, redevelopment is occurring at rapid pace, particularly around the Metrorail station. The 10- to 12-story office complexes originally constructed more than 40 years ago, are being replaced by much larger, mixed-use office, retail and residential developments. Recently, Arlington County completed a multi-modal transportation plan for Rosslyn and anticipates revision of the Rosslyn area sector plan in coming years. The plan details improvements and future studies that need to be conducted to ensure that the basic framework of the vehicular traffic circulation, public transportation, pedestrian and bicycle system elements will support existing and planned development in the area.

The Clarendon/Court House Center and Ballston/Virginia Square Center have employment and residential densities similar to many of the other Mixed Use Centers throughout the region that are centered around Metrorail stations. Both of these Centers have experienced rapid growth over the last 20 years, with 15- to 20-story residential and commercial buildings constructed along the Wilson Boulevard, Clarendon Boulevard, and Fairfax Drive thoroughfares and densities quickly dropping off to single-family neighborhoods to the north and south. As in Rosslyn, an emphasis has been placed on transit- and pedestrian-oriented design, with additional green space and residential amenities such as grocery stores and restaurants. The Clarendon/Court House Center has an existing employment density of 44.5 jobs/acre and a residential density of 17.1 jobs/acre. While its employment density is expected to increase by 35 percent, the area's household density is projected to increase by 64 percent, adding more than 5,000 households. The Ballston/Virginia Square Center has a higher employment density (62.0 jobs/acre) and comparable household density (16.9 households/acre) as Clarendon/Courthouse. Employment and households in the Ballston/Virginia Square Center are also projected to increase substantially, by 41 percent and 50 percent, respectively.



LEGEND

Metro Orange Line and Stations	VRE Manassas Line and Stations
Interstates	I-66 Corridor Boundary
Major Arterials	Activity Centers

FIGURE 3-1
Activity Centers
 I-66 CORRIDOR TRANSIT STUDY
 (INSIDE AND OUTSIDE THE BELTWAY)

B. Employment Centers and Suburban Employment Centers – Fairfax County

The I-66 Corridor passes through or near three Regional Activity Centers within Fairfax County: the Merrifield/Dunn Loring Employment Center and the Fairfax Center and City of Fairfax-GMU Suburban Employment Centers. The primary difference between these two types of areas is the density of employment, the former having a minimum density of 30 jobs/acre by 2030. The Merrifield/Dunn Loring Center is located immediately south of I-66 and centered around the intersections of Gallows Road with U.S. 29 and U.S. 50. This Center has been the focus of planning efforts in recent years, as the County and community have initiated plans for mixed use development surrounding the Dunn Loring Metrorail Station and a new town center located south of U.S. 29 and west of Gallows Road. Current land uses strongly favor commercial development (26.0 jobs/acre compared to 3.0 households per acre). An emphasis has been placed on increasing the number of residents in the area, but commercial uses are projected to continue to be dominant with a 2030 projected density of 33.7 jobs/acre, compared to 4.7 households/acre.

The I-66 Corridor's two Suburban Employment Centers are located near the U.S. 50 and Route 123 interchanges. The City of Fairfax-GMU Center is centered along Route 123 between U.S. 50/U.S. 29 and Braddock Road. The northern portion of this Center is comprised of suburban office development, while the southern portion includes the campus of George Mason University (GMU), a state university with over 30,000 students. Aside from GMU, this Center is predominantly commercial, with an existing employment density of 17.5 jobs/acre and limited residential uses (just 1.2 households/acre). Substantial growth in both uses are projected (35 percent and 50 percent, respectively) but the area is projected remain predominantly commercial in nature. The Fairfax Center area is located nearby to the west of the I-66/U.S. 50 interchange and includes the Fairfax County Government Center, the mixed use Fair Lakes development, and the Fair Oaks Mall. Existing densities in this area are moderate at 12.0 jobs/acre and 4.0 households/acre, with expected growth of about 40 percent by 2030.

C. Emerging Employment Centers – Prince William County

At the western edge of the MWCOC region, I-66 passes through the northern portion of Prince William County, one of the fastest growing counties in the region. One of the primary development areas in the County surrounds the I-66 Corridor. The Bull Run–Sudley Area, Innovation, and Gainesville have been identified as Emerging Employment Centers, defined as areas expected to grow rapidly over the next 25 years or areas that will still have more than 50 percent of their development potential remaining in 2030.

The Bull Run–Sudley Area Center, which borders the Manassas National Battlefield Park to the south, includes the Manassas Campus of Northern Virginia Community College, with an enrollment of 8,000, as well as the Manassas Mall. Innovation center, formally called *The INNOVATION @ Prince William Technology Park*, is a public-private partnership development targeting biotechnology and related businesses, including GMU's life science campus. The Gainesville center includes the Virginia Gateway center, which will consist of office, retail, and housing when completed, and Nissan Pavilion, a 25,000 seat amphitheater.

The Bull Run–Sudley Area is expected to experience moderate employment growth, 24 percent over the next 25 years. However the Gainesville and Innovation centers are projected to grow by 150 percent and 200 percent, respectively. Even with this high level of growth it is projected that each area will remain below 7.0 jobs/acre and less than 7,000 jobs total.

3.3.2 Controls and Comprehensive Planning

This section describes the land use plans and controls in place and provides an assessment of how well they support transit-oriented development near proposed transportation hubs.

A. Arlington County

Arlington County has adopted a land use policy that concentrates high-density development within its Metrorail corridors and preserves lower-density residential areas throughout the remainder of the county. The county has actively planned and managed development in the Rosslyn-Ballston Corridor since the construction of the Metrorail Orange Line was planned in the early 1970s, developing an overall corridor plan that is supplemented with sector plans for each station area. The sector plans, developed in close coordination with the surrounding communities, address land uses, infrastructure, open space, urban design, and zoning. Upon adoption by the County Board, these plans are incorporated into the General Land Use Plan, a component of the County's Comprehensive Plan.

Throughout the Rosslyn-Ballston Corridor, the General Land Use Plan concentrates the highest density uses within walking distance of Metro stations and tapers densities down to the existing single-family residential neighborhoods to the north and south. Each of the station areas is designed to serve a unique function: Rosslyn is primarily a business center; Courthouse is the County's government center; Clarendon is an "urban village"; Virginia Square is a mix of residential, cultural, and educational facilities; and Ballston is planned as Arlington's "new downtown". The highest density areas of the corridor allow Floor-Area Ratios (FAR) of up to 3.8 for office uses and 6.0 for residential uses. (This translates to 240 residential units per acre at 1,000 ft² per unit. In contrast, the majority of the county lies in areas zoned for less than 10 units per acre.)

All stations within the Rosslyn-Ballston Corridor are located below ground with escalator entrances providing access to the street. As noted above, Arlington has emphasized pedestrian mobility and access in its zoning and urban design guidelines. Parking in the corridor is limited to on-street, metered spaces and parking garages (above or below ground). The zoning code allows for relatively low parking densities, typically one space per dwelling unit or per 580 ft² of commercial or office space.

The East Falls Church Station is located at the western edge of Arlington County, within the median of I-66. The station is surrounded primarily by stable single-family residential development that pre-dates the station. A limited amount of apartment/townhouse development is located to the north and west of the station. A planning and transportation study was initiated in September 2007 by the City of Falls Church and Arlington County to generate a land use and transportation vision for transit-oriented development in the station. The goal of the visioning exercise is to develop a plan to set height, density, use mix, and urban design standards for the Arlington County sites within the study area, including the East Falls Church Metro parking lot and other sites that are likely to redevelop. It also will provide recommendation regarding transportation infrastructure, streetscape and other public improvements to create an urban, walkable, and accessible mixed-use environment within this area. The plan is expected to be complete in March 2009.

B. Fairfax County

Three existing Orange Line Metrorail stations—West Falls Church/Fairfax-GMU, Dunn Loring-Merrifield, and Vienna/Fairfax-GMU—are located within Fairfax County and three or four additional stations are included in the County's comprehensive plan. Fairfax County has

developed specific Transit Station Area Plans for each of the three existing stations that balance the need to protect existing residential communities while providing opportunities for transit-supportive land uses and densities. At the West Falls Church-VT/UVA Station, the County has identified a limited area to the south of the station that could be re-developed at a higher density under appropriate conditions.

The Dunn Loring-Merrifield Station lies at the northern end of the Merrifield Suburban Center, an area that has, over the past decade, been re-envisioned as a suburban mixed-use district centered around two core areas, the Dunn Loring Transit Station Area and a new Town Center, which would be connected to the station by a new Main Street. Depending on a number of factors, the area immediately adjacent to the station could be developed with a mix of uses at a FAR of 2.25, with the surrounding areas developed at a maximum of 1.4 FAR. The area north of I-66 at this station is dominated by single-family residential development and is planned to remain such.

As the existing terminus of the Orange Line, the Vienna/Fairfax-GMU Station functions largely as a park-and-ride station, with large surface and structured parking lots. Planned development will be compatible with surrounding development with maximum densities of 0.5 FAR or 20-30 dwelling units per acre. In 2006, a large transit-oriented development at the station, called Metro West, was approved by the Fairfax County Board of Supervisors. The Metro West development will replace 65 single-family detached homes with up to 190,000 square feet of retail space, and up to 300,000 square feet of office space.

As noted above, the Fairfax County Comprehensive Plan calls for the extension of the Metrorail Orange Line to Centreville, with stations located near the Fairfax County Government Center, at Stringfellow Road, and near the U.S. 29/I-66 interchange in Centreville. The Fairfax County Government Center station area includes the Fair Oaks Mall and surrounding commercial uses to the north of I-66, where those uses are permitted up to 0.5 FAR. South of I-66 is planned for a residential/office/retail/recreation mixed-use area with densities up to 0.35 FAR permitted.

The proposed station at Stringfellow Road would function almost exclusively as a park-and-ride location, with residential development limited to 2-3 dwelling units per acre and office uses limited to 0.25 FAR. The Centreville station would be located adjacent to the planned Centreville Suburban Center, a nearly 1,000 acre mixed use development centered around the U.S. 29/Route 28 intersection, that would include residential development up to 35 dwelling units per acre and non-residential uses up to 0.60 FAR at its core.

The location of the possible fourth new Metrorail station, located between the Vienna Station and the proposed Fairfax County Government Center Station, has not been determined and, therefore, no station area planning has occurred.

C. Prince William County

The Prince William County update to the 2007 Comprehensive Plan calls for the provision of commuter parking lots near the U.S. 29 and U.S. 15 interchanges, with I-66 to support carpooling and bus transit services in the corridor. A new park-and-ride lot near the I-66 interchange with Route 234 is included the draft FY2009-2014 TIP and CLRP.

While the U.S. 15 interchange area is planned to remain semi-rural (one dwelling unit per five acres), the U.S. 29 interchange area is planned as a mixed use center. Residential uses are permitted up to 30 dwelling units per acre, but limited to 15 percent of the total area.

4.0 CORRIDOR ROADWAY NETWORK AND CONDITIONS

Within the study area, I-66 regularly operates over capacity in the peak direction outside the Beltway and in the off-peak, or “reverse commute” direction inside the Beltway. This trend is expected to continue into the future as travel demand continues to significantly increase.

The existing corridor roadway network, highway operations, and future conditions are described below. Major sources of data for this chapter included I-66 Multimodal Transportation & Environmental Study (MTES): Technical Memorandum on Existing Transportation Conditions Analysis (VDOT, 2003) and Idea-66: I-66 Inside the Beltway Feasibility Study (VDOT/FHWA, 2005).

4.1 CORRIDOR ROADWAY NETWORK

Within the study area, I-66 ranges from four- to eight-lanes of interstate highway, with 23 full or partial interchanges, multiple configurations of high occupancy vehicle (HOV) lanes, and a section where shoulders are used as travel lanes. Figure 4-1 provides an overview of lane configuration and access points on I-66 throughout the study area. At the western end of the study area, where development patterns are more rural, I-66 has four lanes and a landscaped median. As the highway approaches Manassas and suburban development patterns it widens to eight lanes with a concrete median barrier. This pattern continues until the Capital Beltway where the road returns to four lanes. Inside the Beltway the roadway primarily consists of two lanes in each direction and one reversible lane.

The I-66 Corridor also contains two parallel transportation routes that operate in synergy with I-66 for all or a portion of the study area: Lee Highway (U.S. 29) and Lee Jackson Memorial Highway (U.S. 50). U.S. 29 is a major arterial roadway that runs east-west and generally parallels I-66 from Rosslyn to Gainesville, where it heads off into a more southerly direction. It connects to I-66 in five locations: three in Arlington County (two near Rosslyn, one near Falls Church), one in Fairfax County at Centreville, and one in Prince William County at Gainesville. Within the study area, U.S. 29 is a primarily four- to six-lane roadway, traveling through North Arlington, the City of Falls Church, Merrifield, the City of Fairfax, Centreville and Gainesville. It becomes two lanes for a short distance between Bull Run in Fairfax County and Pageland Lane in Prince William County, where it passes through Manassas Battlefield National Park.

U.S. 50 is a primary arterial highway that generally parallels I-66 from its origin in Washington, D.C. (where it shares the Theodore Roosevelt Memorial Bridge with I-66) to the Fair Oaks area of Fairfax County where it turns northwest toward Chantilly and Middleburg. U.S. 50 is primarily a six-lane divided primary arterial highway, with limited sections having only four lanes. It has different names depending on its location, including Arlington Boulevard within Arlington County and eastern Fairfax County, Fairfax Boulevard within the City of Fairfax, Lee Jackson Memorial Highway in western Fairfax County and John Mosby Highway in Loudoun County. For a short section within the City of Fairfax, U.S. 50 runs concurrent with U.S. 29.

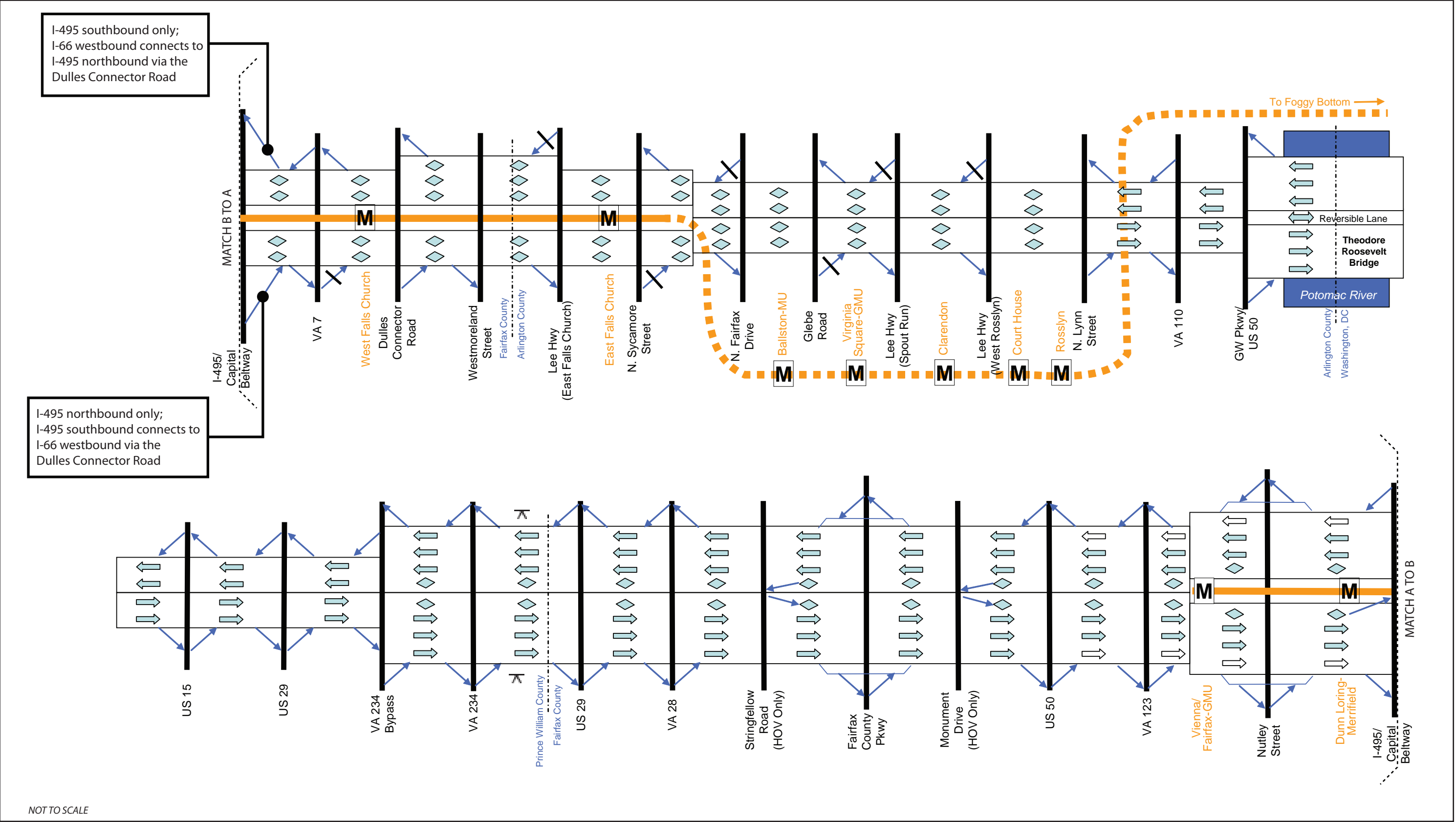


FIGURE 4-1
**Lane and Ramp Configuration
and Access Points**
I-66 CORRIDOR TRANSIT STUDY
(INSIDE AND OUTSIDE THE BELTWAY)

4.1.1 HOV and Shoulder Lanes

To accommodate demand during peak hours, peak direction (eastbound in the morning; westbound in the evening) HOV lanes are provided on I-66 between Route 234 and Washington, D.C. Between Route 234 and U.S. 50, the left-most travel lane operates as a concurrent flow HOV-2 lane. Between U.S. 50 and the Capital Beltway, the left lane remains restricted to HOVs, but the right shoulder is used as a travel lane, providing four general purpose lanes. HOV restrictions are in effect outside the Capital Beltway from 5:30 a.m. to 9:30 a.m. in the eastbound direction and 3:00 p.m. to 7:00 p.m. in the westbound direction. Shoulder use, which is also restricted to the peak direction, has similar but slightly expanded hours of 5:30 a.m. to 10:00 a.m. in the eastbound direction and 3:00 p.m. to 8:00 p.m. in the westbound direction.

Inside the Capital Beltway, I-66 is entirely restricted to HOV-2 vehicles in the peak direction between the Capital Beltway and the Lynn Street interchange in Rosslyn. Restrictions are in effect from 6:30 a.m. to 9:00 a.m. in the eastbound direction and from 4:00 p.m. to 6:30 p.m. in the westbound direction.

4.1.2 Access Points

Several of the interchanges in Arlington County operate as “paired” interchanges, with two nearby partial-access interchanges functioning together to provide full access to a local community (e.g., N. Fairfax Drive and Glebe Road). The I-66/Capital Beltway interchange and those to the east vary greatly both in design and access in comparison to the interchanges outside the Beltway, which are, with a few minor variations, either full/partial cloverleaf or diamond interchanges with provisions for all movements. The interchanges within the study area and basic information on interchange design and access is included in Table 4-1.

TABLE 4-1: ACCESS POINTS FOR I-66

Interchange	Interchange Type	Full Access
GW Parkway/U.S. 50	Eastbound entrance/westbound exit only	No
VA 110	Eastbound exit/westbound entrance only	No
N. Lynn Street	Eastbound entrance/westbound exit only	No
Lee Highway (West Rosslyn)	Eastbound exit/westbound entrance only	No
Lee Highway (Spout Run)	Eastbound exit/westbound entrance only	No
Glebe Road	Eastbound entrance/westbound exit only	No
N. Fairfax Drive	Eastbound exit/westbound entrance only	No
Sycamore Street	Eastbound entrance/westbound exit only	No
Lee Highway (East Falls Church)	Eastbound exit/westbound entrance only	No
Westmoreland Street	Eastbound exit only	No
Dulles Access Road	Partial directional	No ²
VA 7	Partial cloverleaf	Yes
I-495	Partial directional	No ¹
Nutley Street	Full cloverleaf with collector-distributor roads	Yes
VA 123	Modified cloverleaf	Yes
U.S. 50	Partial cloverleaf	Yes
Fairfax County Parkway	Full cloverleaf with collector-distributor roads	Yes

TABLE 4-1: ACCESS POINTS FOR I-66

Interchange	Interchange Type	Full Access
VA 28	Partial cloverleaf	Yes
U.S. 29	Partial cloverleaf	Yes
Route 234	Partial diamond	Yes
Route 234 Bypass	Trumpet	Yes
U.S. 29 (Gainesville)	Partial cloverleaf	Yes
U.S. 15	Diamond	Yes

Notes:

¹ Southbound I-495 traffic must use the Dulles Access Road to connect to I-66 eastbound; I-66 westbound traffic must use Dulles Access Road to connect to I-495 northbound.

² Eastbound Dulles Access Road traffic must connect to I-66 eastbound; eastbound I-66 traffic cannot connect to Dulles Access Road.

4.1.3 Geometric Deficiencies

The Idea-66 and I-66 MTES reports identify a handful of geometric deficiencies regarding vertical clearance, stopping sight distance and shoulder width. Outside the Capital Beltway, there are eight locations where clearances either over or under I-66 do not meet either the minimum standard or guideline (See Table 4-2 below). Minimum vertical clearance over an interstate highway or arterial roadway is 16'-6". Minimum vertical clearance over a collector or local roadway is 14'-6", and desirable vertical clearance is 16'-6". The Washington Metropolitan Area Transit Authority (WMATA) requires a clearance of 15'-0" over Metrorail.

TABLE 4-2: VERTICAL CLEARANCE DEFICIENCIES ALONG I-66

Bridge	Clearance	Comments
Cedar Lane over Orange Line	13'-6"	Does not meet WMATA clearance of 15'-0" over rail line (note that clearance is met over I-66 roadway)
EB I-66 over U.S. 29 (Centreville)	14'-6"	VDOT issued design exception for clearance over principal arterial
WB I-66 over U.S. 29 (Centreville)	14'-6"	VDOT issued design exception for clearance over principal arterial
EB I-66 over Route 658 (Compton Rd)	15'-7"	Compton Rd is a Collector roadway. Minimum criterion met. Desirable criterion not met.
Rte 621 (Bull Run Dr) over EB I-66	14'-10"	
Rte 621 (Bull Run Dr) over WB I-66	15'-6"	
EB I-66 over Route 234 Business	14'-7"	VDOT issued design exception for clearance over principal arterial
WB I-66 over Route 234 Business	14'-8"	The Virginia Department of Transportation (VDOT) issued design exception for clearance over principal arterial

Source: I-66 Multimodal Transportation & Environmental Study: Technical Memorandum on Existing Transportation Conditions Analysis.

Inside the Capital Beltway, with the exception of the area near Spout Run Parkway, the 8-foot wide right shoulder of I-66 does not meet the AASHTO standard of 12 feet. There are also two locations, one near the East Falls Church Metrorail Station and the other near the Harrison

Street overpass where the horizontal stopping sight distance is 700 feet. While this meets the VDOT/AASHTO minimum of 625 feet, it does not meet the desired distance of 850 feet.

4.2 HIGHWAY OPERATIONS

Traffic patterns/characteristics, HOV lane usage, shoulder lane usage, average speeds, and travel times are described below.

4.2.1 Traffic Patterns/Characteristics

Traffic volumes presented in the Idea-66 and MTES reports were utilized to develop the summary below. However, it is important to note that, due to the difference in publication dates, these studies used data from different timeframes. The MTES report, completed in February 2003, used traffic data from 2000 and 2001. The Idea-66 report, published in March 2005, used traffic data from 2003. While traffic volumes almost certainly continued the general growth trend experienced in the region over the last several decades, no effort was made to normalize these values and it is assumed that overall travel patterns did not change substantially in this short period of time.

Outside the Capital Beltway, travel patterns on I-66 generally follow the traditional pattern of commuters traveling toward the region's core (eastbound) in the morning, returning to the suburbs (westbound) in the evening. Traffic volumes grow from approximately 44,000 vehicles (two-way) east of U.S. 29 in Gainesville to more than 187,000 near the Beltway. As eastern Fairfax County has become mostly developed with little room for future growth and new development has been occurring more rapidly in western Fairfax County and Prince William County, traffic volumes in the western portion of the corridor have been growing at a faster rate. Between 1981 and 2001, traffic volumes near the Beltway have doubled or tripled, while volumes east of U.S. 29 in Gainesville have quadrupled. With continued development in these outer suburbs, this trend is likely to continue.

Figure 4-2 provides 2000/2003 traffic volumes for I-66 segments within the study area. As noted above, volumes near Gainesville were 44,000, but quickly grow to over 100,000 east of Manassas. Volumes rise gradually to 120,000 to 135,000 in the Centreville area, but increase substantially again east of U.S. 50, remaining over 180,000 between there and the Beltway.

Due to the growing prominence of suburban activity centers such as Tysons Corner and Springfield and the peak-hour HOV restrictions on I-66 inside the Beltway, the I-66/I-495 interchange serves as a major entry and exit point for I-66. During the morning peak period, approximately one third of the eastbound I-66 traffic continues on I-66 east of the Beltway towards Arlington and Washington, D.C. A third of the traffic exits at the Beltway to travel northbound to go towards the Tysons Corner area and Maryland, and another third travels towards Springfield via the Beltway southbound. During the evening peak period, the reverse is true. For the segment of westbound I-66 between the Beltway and Nutley Street, traffic analysis reveals that approximately one third of the traffic comes from I-66 inside the Beltway. Furthermore, one third of the traffic originates from the northbound Beltway (Inner Loop) and the remainder of the traffic is from the southbound Beltway (Outer Loop).

Inside the Beltway, traffic volumes are relatively light at 74,000 in the segment between the Beltway and the Dulles Connector Road. However, the heaviest volumes occur just east of the same interchange, where high volumes of Dulles Corridor traffic merge with mainline I-66 traffic, resulting in two-way traffic volumes as high as 130,000 vehicles per day. Further east of that



FIGURE 4-2
Traffic Volume
 I-66 CORRIDOR TRANSIT STUDY
 (INSIDE AND OUTSIDE THE BELTWAY)

point, traffic volume tapers to about 73,000 vehicles per day at Rosslyn before climbing back to 102,000 per day east of Rosslyn, where the HOV restrictions are lifted.

Outside the Beltway, I-66 operates over capacity during the morning and evening peak periods and is frequently congested during the middle of the day as well. Under existing conditions, the highest morning and evening peak period traffic volumes on I-66 occur between Route 123 and the Beltway. This section of roadway experiences congestion during both peak periods of the day, and usually in both directions. On I-66 between Route 123 and U.S. 15, high traffic volumes occur on the roadway during the morning peak period in the eastbound direction and during the evening peak period in the westbound direction.

Traffic observed on I-66 between November 2001 and March 2002 indicate that the morning peak hour for I-66 eastbound from U.S. 15 to the Beltway is 6:00 a.m. to 7:00 a.m., while the evening peak hour is 5:00 p.m. to 6:00 p.m. For I-66 westbound, the morning peak hour is 8:00 a.m. to 9:00 a.m. east of Fairfax County Parkway (Route 7100) and 7:00 to 8:00 a.m. west of Fairfax County Parkway out to U.S. 15. The evening peak hour on I-66 westbound is 5:00 p.m. to 6:00 p.m. between the Beltway and Route 234 Business, and is 4:00 p.m. to 5:00 p.m. west of Route 234 Business to U.S. 15.

Inside the Beltway, peak period volumes are affected by the HOV restrictions described above. The Idea-66 report does not provide peak hour volumes¹, however, it notes that typical K factors (the ratio of peak-hour traffic to average daily traffic) range from 0.066 to 0.079, which is lower than typical urban areas.

Traffic volumes collected on the ramps indicate that the morning peak hour occurs between 7:30 a.m. and 8:30 a.m. and the evening peak hour occurs between 6:00 p.m. and 7:00 p.m. One example of the effect of the HOV restrictions is the Dulles Connector Roadway eastbound on-ramp, which shows a peak flow rate of about 500 vehicles per 15-minute interval at about 6:00 a.m., before HOV restrictions take effect. After the 6:30 a.m. start of the HOV restrictions, flow rate drops to about 350 vehicles per 15-minute interval. A second peak flow of about 600 vehicles per 15-minute interval occurs near the traditional 7:00 a.m. peak hour, but this flow drops back off to about 400 vehicles per 15-minute interval at 9:00 a.m. The largest peak flow of the morning occurs after the HOV restrictions end at 9:30 a.m., when flows reach about 650 vehicles per 15-minute interval.

Today, the “reverse commute” from the urban core to the outer suburbs, such as Tysons Corner and Dulles, is rivaling the more traditional commuter patterns. On the Dulles Connector Road eastbound entrance ramp, volumes are actually higher during the evening reverse commute than during the morning peak, and the duration of the reverse-commute volume is much longer than in the morning because of the HOV restrictions.

4.2.2 HOV Lanes

I-66 includes a single concurrent HOV-2 lane from Route 234 to the Beltway and is restricted to HOV-2 vehicles inside the Beltway during peak periods in the peak direction. Outside the Beltway, HOV lane volumes begin modestly, with 1,300 and 1,600 vehicles per day using the eastbound and westbound HOV lanes, respectively, near their terminus near Route 234. East of Route 123, volumes peak at 8,400 eastbound and 10,600 westbound vehicles per day. East of

¹ The Idea 66 study, the most recent study conducted for I-66 Inside the Beltway, did not independently gather travel time data or develop LOS values. Instead, it based LOS discussions on data from aerial surveys, conducted by Skycomp and sponsored by MWCOC.

Nutley Street, HOV volumes drop to 4,900 eastbound and 5,400 westbound vehicles per day, with most of the decline likely attributable to vehicles destined for the Vienna/Fairfax-GMU Metrorail Station.

Peak period HOV volumes for both inside and outside the Beltway were obtained from VDOT for Fall of 2006. Outside the Beltway, the peak period is 3:00 p.m. to 7:00 p.m. and the volume was around 7,400 vehicles at the maximum load point, Nutley Street. Inside the Beltway, the peak period is 4:00 p.m. to 6:30 p.m., and the volume was around 4,500 vehicles at the maximum load point, North Sycamore Street.

4.2.3 Level of Service, Speeds, and Travel Times

Travel conditions inside and outside the Capital Beltway differ substantially due to the HOV restrictions in effect inside the Beltway. As shown in Figure 4-3, travel conditions outside the Beltway follow a traditional peak direction pattern with congestion, severe in several locations, eastbound in the morning peak period and westbound in the evening peak period. Off-peak and non-peak direction travel experiences only light to moderate congestion.

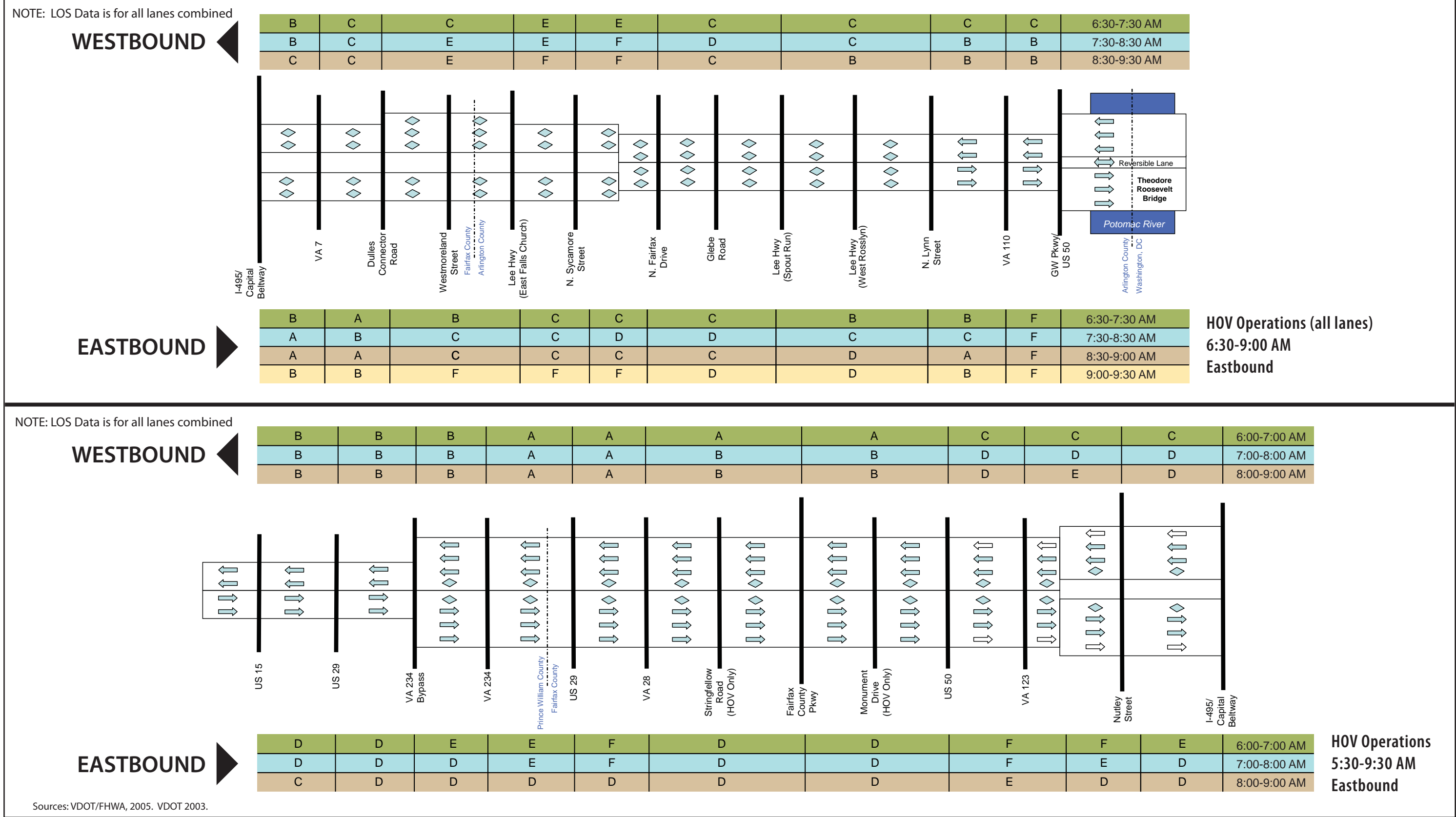
During the morning peak period, moderate congestion occurs as eastbound traffic approaches Route 28, where Level of Service (LOS) drops as low as F; travel speeds in the area of the Route 234 Bypass drop below 20 mph before returning to 60+ mph east of Route 234 Business. Speeds remain above 60 mph and LOS remains D until traffic approaches U.S. 50. Again speeds and LOS drop to below 20 mph and F, respectively. Between U.S. 50 and the Beltway, LOS remains E or F for much of the peak period, with speeds fluctuating substantially but generally remaining under 30 mph.

Travel speeds on the eastbound HOV lane during the morning peak hour are more uniformly distributed than the general purpose lanes, although speeds in the area approaching U.S. 50 were observed to be between 10 and 30 mph. However, between Route 123 and the Beltway, where the general purpose lanes fluctuate greatly, HOV speeds range from 40 to more than 60 mph. The locations of congestion in the HOV lane were found to be the same as in the general purpose lanes, suggesting that vehicles changing lanes into and out of the concurrent HOV lane interfere with HOV travel.

Westbound travel during the evening peak period follows a similar pattern, with severe congestion between the Beltway and U.S. 50. Speeds fluctuate greatly, ranging from 20 to 50 mph, with LOS F conditions throughout most of the peak period. Travel speed increases and LOS improves west of U.S. 50, to over 60 mph and primarily LOS D, respectively. Conditions again deteriorate, however, near Route 234 Business, where the HOV lane and a general purpose lane are dropped, forcing I-66 westbound traffic into two lanes.

As in the morning peak hour, travel conditions on the westbound HOV lane are better than the general purpose lanes. However, like the morning peak hour, congestion exists between the Beltway and U.S. 50, with speeds between Nutley Street and Route 123 below 20 mph, indicating stop-and-go conditions. Also like the morning peak hour, the locations of congestion in the HOV lane indicate that the congestion is caused by vehicles changing lanes into and out of the concurrent HOV lane.

During off-peak hours, speeds on I-66 outside the Beltway are typically over 60 mph. During the evening peak hour, eastbound travel becomes moderately congested approaching the Beltway, where speeds drop below 60 mph and LOS is D or E. During the morning peak hour, westbound travel is moderately congested between the Beltway and U.S. 50, but speeds remain above 60 mph.



LEGEND

HOV Lane

General Purpose Lane

A to F = Level of Service

Reversible Lane

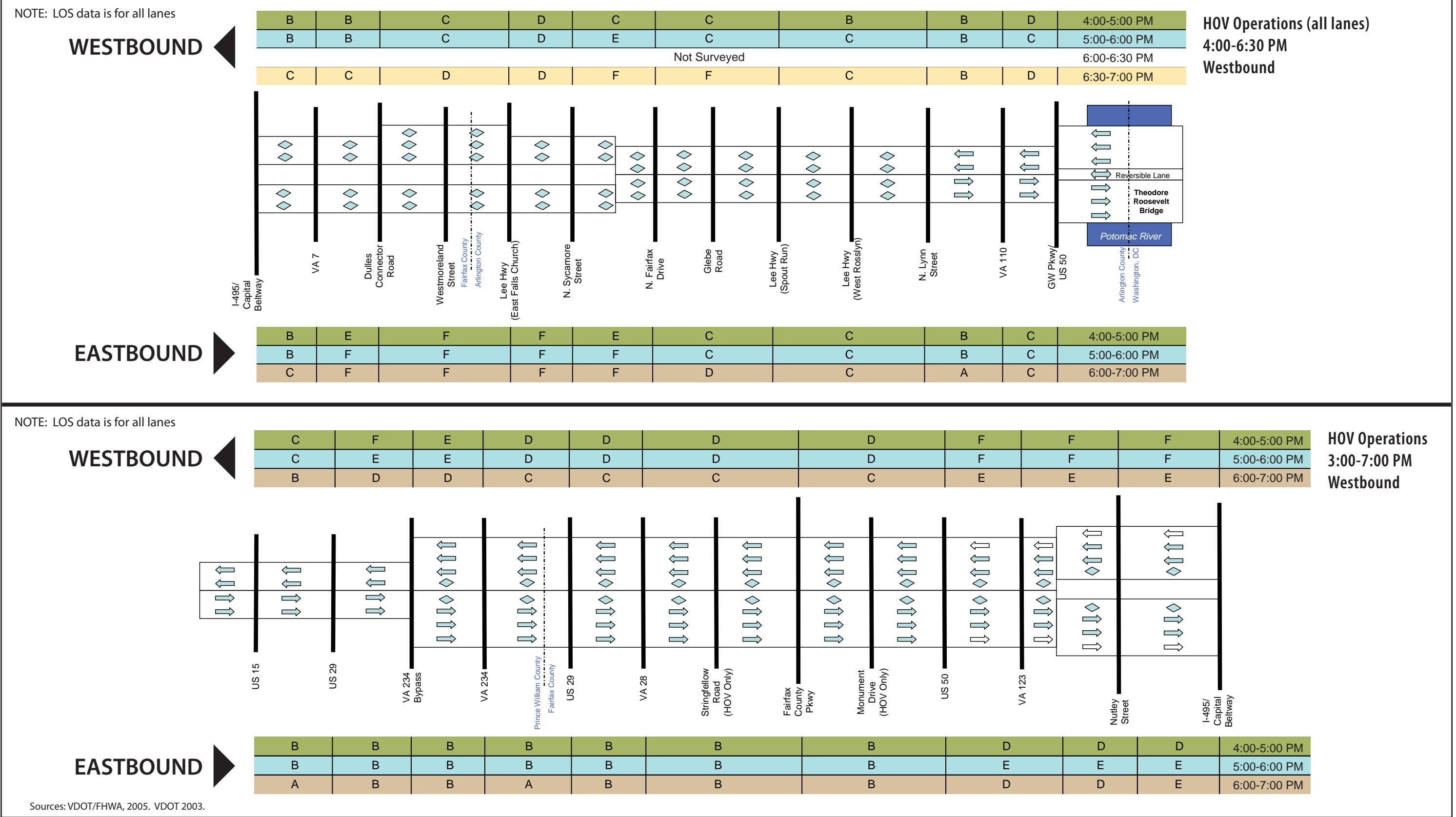
Shoulder Use Lane

NOT TO SCALE

FIGURE 4-3a

Levels of Service
AM Peak Hour

I-66 CORRIDOR TRANSIT STUDY
(INSIDE AND OUTSIDE THE BELTWAY)



Inside the Capital Beltway, travel patterns are complicated by the HOV restrictions and the “reverse commute” to activity centers such as Tysons Corner, the Dulles Corridor, and Fairfax.

Because of the HOV restrictions, peak direction travel during the HOV period is generally free flow. In the eastbound direction, I-66 operates at LOS A and B until the Dulles Connector Road traffic enters and LOS drops to C or D until Rosslyn. At Rosslyn, LOS drops to F due to the lifting of the HOV restrictions and congestion on the Roosevelt Bridge. Once the HOV restrictions are lifted at 9:00 a.m., LOS immediately drops to F between the Dulles Connector Road and Fairfax Drive. In the westbound direction, the evening commute follows a similar pattern. Travel conditions are good, generally between LOS B and D throughout. However, in the half-hour following the HOV restrictions, the segment between Lee Highway (Spout Run) and Sycamore Street degrades to LOS F. Because of the third lane that exists between the Lee Highway entrance ramp and the Dulles Connector Road interchange, the LOS between improves to LOS D in this area.

The reverse commute, which is not subject to HOV restrictions, suffers from moderate to severe congestion throughout the peak period. During the morning peak period, a four- to five-mile segment of I-66 westbound from before Fairfax Drive to the Dulles Connector Road is congested, operating at LOS E and F and average speeds between 25 and 50 mph. During the evening commute, eastbound I-66 suffers from more severe congestion, with the segment from Route 7 to Fairfax Drive operating at LOS F throughout the peak period, with the most severe congestion between Route 7 and Westmoreland Street.

4.3 FUTURE CONDITIONS

Recent and pending operational changes and future operating conditions are described below.

4.3.1 Recent and Pending Construction Changes

VDOT and the Virginia Department of Rail and Public Transportation (DRPT) both continue to respond to increasing travel demand in the I-66 Corridor through capital improvements and operational changes to improve mobility. In November 2006, VDOT completed the widening of I-66 between Route 234 Business and Route 234 Bypass from four lanes with no HOV lane to eight lanes with one concurrent HOV lane. This segment now matches the I-66 cross-section to the east to U.S. 50. Upon completion of that segment, VDOT began construction to continue this eight-lane with HOV cross-section to U.S. 29 in Gainesville. This project is expected to be completed in 2010. VDOT is also widening U.S. 15 to make it a four-lane divided facility with a median from North of Dominion Valley to North of Utterback Lane. This is anticipated to be completed late 2009.

4.3.2 Future Operating Conditions

Travel demand in the region is expected to continue its overall growth trends. As development continues to intensify and spread in the western portion of the study area, vehicle trips in the I-66 Corridor will continue to grow.

Outside the Capital Beltway, home-based work trips originating within the study area are expected to increase by 49 percent (from 352,000 to 523,000) between 2000 and 2025, while home-based work trips destined for the study area are expected to increase by 39 percent (from 280,000 to 388,000), with growth occurring at higher rates in Prince William and Loudoun Counties, than in Fairfax County. Transit trips in the corridor are expected to increase at an even greater rate, although they will remain only approximately 10 percent of all home-based

work trips. Changes to HOV restrictions both inside and outside the Beltway would reduce traffic volumes and maintain an acceptable level of service.

Table 4-3 details projected traffic volumes for various points on I-66 within the study area. The data for I-66 outside the Beltway are for 2002 and 2025; inside the Beltway they are for 2005 and 2030.

TABLE 4-3: PROJECTED TRAFFIC VOLUMES ON I-66¹

Location	2002	2025	Percent Change
East of the I-66/U.S. 15 Interchange	44,000	106,900	143%
East of the I-66/Route 234 Interchange	112,400	149,500	33%
East of the I-66/Route 28 Interchange	131,500	203,200	55%
East of the I-66/Route 7100 Interchange	131,100	190,600	45%
East of the I-66/Route 123 Interchange	178,200	222,900	25%
East of the I-66/Route 243 Interchange	186,600	224,400	20%
West of the I-66/Capital Beltway Interchange	186,600	224,600	20%
West of the Fairfax Drive Interchange ²	98,400	90,900	-8%

Sources: I-66 Multimodal Transportation & Environmental Study: Technical Memorandum on Existing Transportation Conditions Analysis; VDOT and FHWA, 2005. Idea-66: I-66 Inside the Beltway Feasibility Study.

Notes: ¹ Volumes are for both directions combined ² This data is from 2005 and 2030 rather than 2002 and 2025.

Peak period volumes are expected to follow a similar pattern, with volumes at the western end of the study area near Route 28 expected to increase by 50 percent and traffic volumes near Route 123 expected to increase by 27 percent. Inside the Beltway, the revised HOV restrictions, which previous CLRP submissions have shown changed to HOV3+, will significantly reduce peak period/peak direction volumes. In the morning, eastbound volumes west of Fairfax Drive are expected to drop 45 percent (from 8,800 to 4,800 vehicles per day). In the evening, westbound volumes at the same location are expected to drop 41 percent (from 10,500 to 6,200 vpd). In contrast, the morning westbound traffic, which is not subject to HOV restrictions, is expected to increase, but by only 1 percent (from 8,400 to 8,500 vpd) because congestion would limit any new traffic growth. (Data was not provided in the Idea 66 report for eastbound traffic during the evening peak period.)

Outside the Beltway, peak period traffic conditions are expected to degrade significantly. Drivers today typically experience limited sections of LOS E or F in the peak direction during peak periods, typically between the Beltway and U.S. 50. By 2025, these conditions will exist from the Beltway to U.S. 15. Because of the change to HOV-3+, the HOV lane is projected to operate at acceptable levels, except for the area near the Route 123 interchange. (Similar data is not currently available for I-66 inside the beltway.)

Growing demand for travel in the corridor will also impact parallel routes. As motorists seek alternate routes, daily traffic volumes on U.S. 50 within the entire study area are projected to increase from a range of 39,400 to 74,000 vehicles per day in 2002 to a range of 53,600 to 108,100 vehicles per day in 2025. The range in daily traffic volumes on U.S. 29 within the entire study area also is projected to change from 11,800 to 44,900 vehicles per day in 2002 to a range of 17,100 to 59,500 vehicles per day in 2025. These data are from the MTES report and reflect the sum of the eastbound and westbound volumes at multiple screenlines along each route. Despite the planned improvements to U.S. 29 and to U.S. 50, levels of service along these two roadways will slightly worsen.

4.4 CORRIDOR PEDESTRIAN AND BICYCLE NETWORK

The existing bike network in the corridor consists primarily of a single regional trail and local on-street feeder routes. The Martha Custis Bike and Pedestrian Trail begins in Rosslyn where it connects to the Mount Vernon Trail. After utilizing local streets within Rosslyn, the trail becomes an off-street paved path that parallels I-66 for approximately four miles, where it terminates at the Washington & Old Dominion Trail (W&OD) east of the East Falls Church Metrorail Station. The W&OD Trail, which begins in Shirlington, is an off-street paved trail for its entire 45-mile length. After connecting with the Custis Trail, the W&OD parallels I-66 for a period, then traverses the City of Falls Church and the Shreveewood neighborhood of Fairfax County. After crossing I-495 near the I-66 interchange, it heads northwest through the Town of Vienna, Reston, and Leesburg, terminating in Purcellville in Loudoun County. Both Arlington County and Fairfax County have a network of on-street bike routes connecting to the Custis/W&OD trail.

Bicycle and pedestrian access to Metrorail Stations in the corridor are provided via on-street and sidewalk facilities. Each of the existing Orange Line Stations in the I-66 Corridor has bike racks; most stations also provide enclosed bike lockers. In total, over 500 bikes can be securely parked at these stations. Additionally, every Metrobus is equipped with a rack that can carry up to two bikes, with no additional fare required.

The comprehensive plans covering the Corridor all call for improvements to the bicycle and pedestrian networks. The most significant planned facility would be an off-street paved trail (minimum 8 feet wide) along the full length of I-66 within Fairfax County as part of the County's Major Regional Trail System. The location of this trail is not specified in the plan.

Other off-street trails are proposed in the I-66 Corridor, connecting major activity centers, surrounding neighborhoods, and existing and proposed Metrorail stations. Fairfax County's plan also calls for trails along the full length of both U.S. 29 and U.S. 50. Along U.S. 29 the plan indicates that the trail should be mostly off-road. Its location varies; at times it is along both sides of the roadway and only one side in other areas. The proposed width and surface of the trail also varies. The trail along U.S. 50 is proposed along both sides of the roadway in most locations and is proposed to be on-road, paved and from four to eight feet in width.

Prince William County has proposed an off-street trail along U.S. 29 from the Fauquier County line to Manassas National Battlefield Park. This trail is proposed to be eight to ten feet in width, running along the south side of U.S. 29.

5.0 CORRIDOR TRANSIT SYSTEM

The existing transit system in the I-66 Corridor includes a wide variety of services ranging from high capacity, fixed-route rail transit operations to local circulator bus routes. Transit services include Metrorail, commuter rail (Virginia Railway Express), fixed-route bus services, commuter/express bus service, ride share programs, and paratransit services. A variety of related facilities are also provided including park-and-ride lots, transit centers, and vehicle maintenance and storage facilities.

Seven transit providers currently serve the I-66 Corridor: Arlington County, Fairfax City, Fairfax County, Loudoun County, Potomac and Rappahannock Transit Commission (PRTC), Northern Virginia Transportation Commission (NVTC), and Washington Metropolitan Area Transit Authority (WMATA).

5.1 CURRENT TRANSIT OPERATING ENVIRONMENT

The primary transit services in the I-66 Corridor are summarized in Table 5-1. Maps of these services are provided in Figures 5-1 to 5-3.

TABLE 5-1: SUMMARY OF PRIMARY TRANSIT SERVICES IN I-66 CORRIDOR

Name of Service	Provider	Type of Service	Total Number of Lines/ Routes	Number of Lines/ Routes in Corridor	Peak Service Frequencies in Corridor
Metrorail	WMATA	Regional Heavy Rail	5	1	6 min.
Virginia Railway Express (VRE)	NVTC/PRTC	Commuter Rail	2	1	2 trains/hour
Metrobus	WMATA	Regional service, local circulation	338	38	15-30 min.
Arlington Transit (ART)	Arlington County	Local and peak only circulator service	10	8	30 min.
Fairfax Connector	Fairfax County	Local and peak only circulator service	54	21	30 min
CUE	City of Fairfax	Local circulator service	4	4	30 min.
Omni Ride	PRTC	Commuter Bus service	14	3	20 min.
Loudoun County Transit	Loudoun County	Commuter Bus service	7	7	30 min.

Sources: WMATA.com, VRE.com, ArlingtonVA.us, PRTCtransit.org, Loudoun.gov

Ridership is strong on all of the transit services in the corridor. In the last 10 years, Metrobus and Metrorail ridership has increased by 30 percent and more than doubled on the other systems combined (NVTC 2005).



LEGEND

- Red Line • Glenmont to Shady Grove
- Orange Line • New Carrollton to Vienna/Fairfax-GMU
- Blue Line • Franconia-Springfield to Largo Town Center
- Green Line • Branch Avenue to Greenbelt
- Yellow Line • Huntington to Fort Totten

FIGURE 5-1
Metrorail System
I-66 CORRIDOR TRANSIT STUDY
(INSIDE AND OUTSIDE THE BELTWAY)



FIGURE 5-2
VRE System Map
 I-66 CORRIDOR TRANSIT STUDY
 (INSIDE AND OUTSIDE THE BELTWAY)



Source: WMATA, 2008.

FIGURE 5-3
Corridor Bus Services
 I-66 CORRIDOR TRANSIT STUDY
 (INSIDE AND OUTSIDE THE BELTWAY)

A summary of annual ridership on the transit systems operating in the I-66 Corridor is provided in Table 5-2.

TABLE 5-2: ANNUAL TRANSIT RIDERSHIP (FY 2003 – FY 2007)

Transit Line	Ridership (Annual Passenger Trips)				
	FY2003	FY2004	FY2005	FY2006	FY2007
Metrorail – Orange Line ¹	34,305,583	35,457,908	35,593,851	37,589,313	37,277,364
VRE – Manassas Line ¹	1,429,610	1,611,275	1,755,589	1,833,227	n.a.
Metrobus – Northern Virginia ¹	18,653,735	n.a.	16,874,165	18,418,715	18,270,357
ART ²	397,001	674,806	788,854	926,574	1,060,400
Fairfax Connector ²	7,595,138	7,990,825	8,474,143	9,529,056	9,717,390
CUE ²	925,000	985,500	1,068,492	1,093,926	1,135,758
Omni Ride ²	1,182,996	1,251,316	1,392,432	1,608,583	1,738,556
Loudoun County Transit ²	281,829	392,901	513,766	602,233	652,347

Source: Northern Virginia Transportation Commission, 2008. *Northern Virginia Annual Transit Performance Updates – FY2007*.

Notes: ¹ Annual Weekday Passenger Trips; ² Bus ridership shown is for all routes in Northern Virginia; n.a. data not available

5.1.1 Metrorail – Orange Line

WMATA operates Metrorail's Orange Line, a heavy-rail service that runs from Vienna-Fairfax/GMU to New Carrollton Station. As shown in Figure 5-1, there are 9 stations in the project corridor: Rosslyn, Court House, Clarendon, Virginia Square-GMU, Ballston-MU, East Falls Church, West Falls Church-VT/UVA, Dunn Loring-Merrifield, and Vienna/Fairfax-GMU.

Orange line trains serve the stations from 5:00 a.m. to 12:00 a.m.; headways are six minutes during the day and at peak hours, and 12 to 20 minutes in the evenings. Fares on the line range from \$1.65 to \$4.50 and are based on the distance traveled. A rail transfer saves \$.35 on a trip continuing by bus. Parking is available at East Falls Church, West Falls Church-VT/UVA, Dunn Loring-Merrifield, and Vienna/Fairfax-GMU stations. Station parking is heavily utilized, with each station seeing full utilization on a daily basis. Parking at WMATA park-and-ride lots costs \$4.50.

Ridership on the Orange Line has grown rapidly since it began service in 1986. As shown in Table 5-3, it has grown by more than eight percent over the last five years alone. To reduce overcrowding in the peak hour on the inner portion of the Orange Line, WMATA has increased both the number of trains (to reduce headways) and the length of some trains (from 4- and 6-car trains to 8-car trains).

TABLE 5-3: RIDERSHIP TRENDS ON METRORAIL ORANGE LINE

Station	Ridership (Annual Passenger Trips)				
	FY2003	FY2004	FY2005	FY2006	FY2007
Rosslyn	7,485,725	7,898,222	7,925,961	8,133,052	7,920,913
Courthouse	3,431,250	3,597,625	3,629,474	3,690,877	3,546,592
Clarendon	1,456,830	1,621,269	1,771,575	1,973,350	2,021,585
Virginia Square-GMU	1,461,947	1,536,825	1,611,381	1,731,054	1,873,120
Ballston-MU	5,696,130	5,712,798	5,766,470	5,977,165	6,010,523
East Falls Church	1,985,284	1,992,590	1,976,060	2,035,892	2,012,621

TABLE 5-3: RIDERSHIP TRENDS ON METRORAIL ORANGE LINE

Station	Ridership (Annual Passenger Trips)				
	FY2003	FY2004	FY2005	FY2006	FY2007
West Falls Church-VT/UVA	4,158,740	4,284,408	4,535,428	4,936,902	4,884,962
Dunn Loring-Merrifield	2,369,929	2,422,419	2,467,341	2,583,315	2,629,611
Vienna/Fairfax-GMU	6,259,748	6,391,752	5,910,161	6,527,706	6,377,437
Total Ridership	34,305,583	35,457,908	35,593,851	37,589,313	37,277,364

Source: Northern Virginia Transportation Commission, 2008. *Northern Virginia Annual Transit Performance Updates – FY2007*.

Ridership growth at the stations near the end of the Orange Line is constrained by Metrorail access. Park-and-ride lots regularly fill to capacity and some feeder bus service also operates near capacity. Other feeder bus service is constrained by access into the stations as a result of the highly congested roadway network and lack of direct access into the station areas from the HOV lanes on I-66.

The Metrorail system itself is also constrained. Crowding along the Orange Line is an issue, particularly between Court House and the core of system in Washington, D.C. The number of trains operating along the line is limited to 13 per hour, as the line shares track with the Blue Line between Rosslyn and Stadium/Armory. WMATA has started to introduce 8-car trains with a goal to have 50 percent 8-car trains in service this year (WMATA, 2008).

WMATA anticipates approximately 970,000 daily riders using the Metrorail System in 2030 (WMATA, 2008). This represents a 42 percent increase in ridership between 2005 and 2030. This growth will almost certainly be affected by the recent increases in gas prices, as commuters seek more cost effective routes. It also could be influenced by a number of unknown future events such as modifications to the Metrorail network, increased parking costs near Metrorail stations, and population and job growth beyond what is already forecasted (WMATA 2008).

The introduction of the Metrorail extension to Dulles (the Silver Line) by 2020 will have a significant effect on system ridership, the West Falls Church Station, and line capacities through Arlington that are already high due to the high growth in the Rosslyn-Ballston Corridor. Regional forecasts show significant increases (108 percent) in peak hour trips originating within the Rosslyn-Ballston Corridor by 2030 (WMATA, 2008). This level of trip generation places the Rosslyn-Ballston Corridor on par with the major employment centers in the urban core.

Further, to meet the need for increased and longer trains on the Orange Line and accommodate the future new Dulles (Silver Line), the Metrorail operating plan includes a split of the Blue Line service through the Rosslyn tunnel. Beginning in 2010, the Blue Line would be split such that half of the trains would follow the Yellow Line and then the Green Line alignment to Greenbelt, while the other half would follow the Blue Line's current route. Similarly, a portion of the Orange Line trains would follow the present Blue Line route to Largo Town Center instead of New Carrollton. By 2010, approximately half of the trains in operation would be six-car and half would be eight-car, and by 2020, all trains would be eight-car. The split of the Blue Line will allow WMATA to provide the maximum level of service along the Orange Line and through the tunnel at Rosslyn. It will also improve reliability at the Rosslyn tunnel.

Another effect of the new Silver Line service is the resulting decrease in express bus services along the Dulles Corridor after Metrorail begins operations. This will result in a large drop in

ridership at West Falls Church (50 percent reduction) and excess capacity for bus-to-rail transfers.

To address the line capacity issues and meet growing passenger demand, WMATA has planned to implement 8-car trains throughout the system by 2020. However, they are only funded for the 50 percent 8-car trains up to 2010. Given the funding uncertainty for the additional railcars beyond 2010, WMATA has conducted a detailed study of when and where the system would reach capacity during the morning peak hour (WMATA, 2008).

In terms of passenger load per car (with rail car capacity equal to 120 passengers per car), without additional railcars beyond what is currently funded, the Orange and Silver (Dulles) lines between Courthouse and Rosslyn are expected to exceed capacity by 2020, exacerbating the already crowded conditions during the peak hour. The growth on the Orange Line and the opening of the Silver (Dulles) Rail Line will result in a significant increase in the total load inside Arlington. If Metro were able to fund and implement all 8-car trains according to their proposed schedule, the system would be able to extend capacity by about 5 additional years (WMATA, 2008). Based on either scenario, the Orange Line through Arlington is anticipated to reach capacity before 2025.

5.1.2 Virginia Railway Express – Manassas Line

Virginia Railway Express (VRE) provides commuter rail service for approximately 15,000 daily riders along its two line, 89-mile system (see Figure 5-2). VRE's weekday-only service is focused mainly on peak-direction commuter trips between outlying suburbs and activity centers in Arlington, Alexandria, and downtown Washington.

VRE is a transportation partnership of the Northern Virginia Transportation Commission (NVTC) and the Potomac and Rappahannock Transportation Commission (PRTC), which represent the counties and municipalities within the VRE service area. Although VRE owns rail yards at the southern ends of its two lines, the lines themselves are owned by the railroads. VRE has access agreements with the railroads and with Amtrak (which controls Union Station and the Ivy City yard in Washington, D.C., where VRE train sets are stored mid-day).

Within the I-66 Corridor study area, VRE provides commuter rail service along its Manassas Line. After sharing the same right-of-way with the Fredericksburg Line for approximately 9.6 miles from Union Station to just south of Alexandria, the Manassas Line diverges, continuing west and roughly paralleling I-66 through Fairfax County and the cities of Manassas Park and Manassas, approximately 5 miles south of I-66. Station stops along the approximately 37-mile route include four stations shared by both lines (Union Station, L'Enfant, Crystal City, and Alexandria), followed by the Backlick Road, Rolling Road, and Burke Centre, Manassas Park, Manassas, and Broad Run stations. With the exception of the Broad Run Station, VRE passengers can connect with some form of local or regional transit service at all stations.

VRE operates seven morning trains (six inbound, one outbound) and nine afternoon/evening trains (seven outbound, two inbound) on the Manassas Line each day. Fares are based on zones, ranging from \$7.45 for a single-ride ticket from Broad Run (Zone 6) to Union Station (Zone 1) to \$2.50 for a single-ride ticket entirely within Zone 6 or entirely within Zone 4. Discounted multi-trip tickets and monthly passes are also available, and multi-fare pass holders may ride two northbound and two southbound Amtrak-operated trains that make limited stops along the corridor by purchasing a \$10 "step-up" ticket.

Ridership on the Manassas Line has shown rapid growth since service began in 1992, and VRE predicts a doubling of ridership to 30,000 daily passengers in 2025. Currently, many peak trains are at or over capacity, and ridership continues to grow despite overcrowded trains and insufficient station parking capacity. Ridership trends for the past five years are shown in Table 5-4.

TABLE 5-4: RIDERSHIP TRENDS ON VRE'S MANASSAS LINE

Station	Ridership (Annual Passenger Trips)				
	FY2003	FY2004	FY2005	FY2006	FY2007
Union Station	180,748	201,561	216,132	225,688	202,911
L'Enfant	318,712	355,780	384,383	406,915	365,093
Crystal City	172,148	189,820	196,387	209,855	191,340
Alexandria	50,292	56,390	61,200	61,425	57,790
Backlick Road	32,701	34,056	39,432	51,068	42,758
Rolling Road	88,189	97,389	105,749	117,901	98,570
Burke Center	164,568	189,146	210,972	184,838	175,029
Manassas Park	135,075	154,229	170,814	174,178	155,923
Manassas	148,722	167,277	184,094	147,138	150,627
Broad Run	138,456	165,626	186,426	254,222	201,711
Total Ridership	1,429,610	1,611,275	1,755,589	1,833,227	1,641,752

Source: Northern Virginia Transportation Commission, 2008. *Northern Virginia Annual Transit Performance Updates – FY2007*.

VRE is limited by the number of trains it can run, both by its access agreements with the freight railroads and because of train storage capacity constraints at the Ivy City Yard. These limitations, coupled with an aging fleet and infrastructure, make investments in rolling stock, storage yards, and other capacity projects essential. Without them, VRE will be unable to meet the growing demand by running longer and/or additional trains. Further complicating the matter is the fact that both lines operate along busy, mixed-traffic corridors shared with Amtrak and freight trains. Although the volume of Norfolk Southern's freight traffic and overall traffic on the Manassas Line are both lower than the respective CSXT freight and total volumes on the Fredericksburg Line.

To address their system-wide challenges, VRE completed a Strategic Plan to guide future growth and development through 2025 (*Virginia Railway Express Strategic Plan 2004-2025*, May 2004). The Strategic Plan recommended a strategy to first keep pace with ridership growth (such as expanding station parking, rolling stock, and train storage and maintenance capacity) and then seek opportunities to improve service and expand coverage.

Based on the recommendations of the Strategic Plan, parking and station improvements have recently been completed or are underway at several stations on the Manassas line, including: Broad Run, Manassas, and Burke Centre. Improvements to the station platforms to accommodate longer trains are needed prior by 2010. Other improvements underway include procurement of new rolling stock to replace leased and aging equipment, to add bi-level Gallery cars, and replace locomotives.

The increasing demand for rail freight in the Northeast, in combination with the growing demand of additional VRE service, has resulted in the need for improvements to the rail infrastructure

along both lines. A number of critical rail infrastructure projects are included in a Memorandum of Understanding (MOU) between VRE, CSXT, and the Commonwealth of Virginia, including several projects along the shared portion of the lines in the Washington, D.C.-Arlington-Alexandria core. These projects include the addition of a third track and upgrading signals to allow VRE, Amtrak, and freight trains to more easily maneuver around one another.

Capacity along the Norfolk Southern portion of the Manassas Line is adequate at the present time, but a second track may eventually be needed to handle future demand. Further, if the extension does occur, an additional storage and maintenance facility will also be needed.

Extension of the Line to Gainesville and Haymarket is recommended based on ridership projections, but only after VRE's core needs are been addressed. Earlier this year, VRE initiated a study to identify and evaluate alternatives for service extension to Gainesville/Haymarket. If advanced, the extension would likely be constructed in two phases, beginning with an 8-mile extension to Gainesville sometime in the next five to seven years. The schedule for the remaining 3-mile extension to Haymarket would depend on VDOT's plans to replace the existing at-grade crossing at U.S. 29 in Gainesville with a new railroad bridge over the highway, a project which is currently in the design phase. The extension would also require that the single Norfolk Southern "B" Line track be upgraded to allow for the higher speeds required by passenger service.

5.1.3 Regional and Local Buses

As shown in Figure 5-3, a wide variety of bus service is available in the I-66 Corridor. An overview of the bus routes within the I-66 Corridor, including the frequency of service and type of service offered is presented in Table 5-5.

TABLE 5-5: BUS ROUTES WITHIN I-66 CORRIDOR

Bus Route by Provider	Number of Daily Trips	Peak (minutes)	Midday (minutes)	Evening (minutes)	Type
Arlington Transit					
Columbia Pike-Ballston-Court House	58	15	15	--	Local
Ballston-Virginia Hospital Center-East Falls Church	50	15	15	15	Local
Ballston - Old Glebe - East Falls Church	30	30	60	--	Local
Rosslyn-Court House Metro Shuttle	20	25	25	--	Local
Ballston Metro to Court House Metro	15	30	--	--	Local
Ballston Virginia Square Lunch Loop	--	--	13	--	Local
Wakefield H.S.-Carlin Springs Rd.-Ballston	8	30	--	--	Local
City of Fairfax					
Cue Gold	60	32.5	32.5	60	Local
Cue Green	55	35	35	60	Local
Fairfax Connector					
Backlick-Gallows Road Line	30	30	60	80	Local
Fairfax County Government Center Line	42	30	60	60	Local
Herndon/Reston Town Center Line	80	18	30	30	Local

TABLE 5-5: BUS ROUTES WITHIN I-66 CORRIDOR

Bus Route by Provider	Number of Daily Trips	Peak (minutes)	Midday (minutes)	Evening (minutes)	Type
North Reston Line	14	30	--	--	Local
Reston South Express Line	--	20	--	--	Express
Reston Town Center Line	60	30	30		Local
Reston/Herndon Reverse Commute Line	19	30	--	--	Commuter
South Reston Line	28	30	--	--	Local
Tyson's Corner/Reston Town Center Line	18	60	60	--	Local
Tyson's West* Park Transit Station / West Falls Church Metro	106	15	30	50	Local
Vienna-Merrifield-Dunn Loring Line	8	30	--	--	Local
Loudoun County Transit					
Broad Run Farms - West Falls Church	7	30	--	--	Commuter
Dulles North Transit Center - Rosslyn/Pentagon/Washington, D.C.	23	10	--	--	Commuter
Dulles South - Rosslyn/Pentagon/Washington, D.C.	7	30	--	--	Commuter
Hamilton - Rosslyn/Pentagon/Washington, D.C.	12	15	--	--	Commuter
Leesburg - Rosslyn/Pentagon/Washington, D.C.	19	15	--	--	Commuter
Purcellville - Rosslyn/Pentagon/Washington, D.C.	12	15	--	--	Commuter
West Falls Church to Dulles North	10	30	--	--	Commuter
OmniRide					
Linton Hall Metro Direct	4	45	--	--	Commuter
Manassas	10	15	--	--	Commuter
Manassas Metro Direct	9	30	--	--	Commuter
OmniLink					
Manassas	7	60	--	--	Local
Manassas Park (Loop A)	15	60	--	--	Local
Manassas Park (Loop B)	16	55	--	--	Local
WMATA - Metrobus					
28A, B Alexandria-Tysons Corner Line	38	40	60	--	Local
38B - Ballston-Farragut Square Line	44	15	30	60	Local
24P - Ballston-Pentagon Line	25	20	60	--	Local
15K, L - Chain Bridge Road Line	10	26	--	--	Local
5A - D.C.-Dulles Line	--	--	--	--	Express
1C - Fair Oaks - Dunn Loring Line	24	25	60	--	Local

TABLE 5-5: BUS ROUTES WITHIN I-66 CORRIDOR

Bus Route by Provider	Number of Daily Trips	Peak (minutes)	Midday (minutes)	Evening (minutes)	Type
26A, E GEORGE, City of Falls Church Local Transit East Falls Church Line	41	25	45 minutes	--	Local
3Y - Lee Highway - Farragut Square Line	12	30	--	--	Local
3A, B, E - Lee Highway Line	50	30	60	45	Local
24T - McLean Hamlet-East Falls Church Line	--	--	--	--	Local
23A, C - McLean-Crystal City Line	51	30	30	60	Local
4A, B, E, H - Pershing Drive-Arlington Blvd Line	59	30	55	45	Local
3T - Pimmit Hills Line	32	20	60	--	Local
2T - Tysons Corner-Dunn Loring Line	25	30	60	60	Local
28T – Tysons Corner-West Falls Church Line	18	20	--	--	Local
2A, B, C, G Washington Blvd. - Ballston-Vienna-Oakton Lines	66	30	60	35	Local
1A, B, E, F, Z Wilson Boulevard Line	63	30	30	30	Local
12A,E,F,G - Centreville - South	19	35	--	--	Local
12C,D - Centreville North	12	35	--	--	Local
12L,M - Little Rocky Run - Vienna	10	35	--	--	Local
12R,S - Stringfellow Road - Vienna	15	35	--	--	Local
20F,W,X,Y - Chantilly - Greenbriar	7	35	--	--	Local

Sources: WMATA.com, VRE.com, Arlington County.com, PRTC.com, Loudoun County.com

A. Metrobus

WMATA operates local, enhanced, and express bus services in the area. While some routes serve Washington D.C., most of the routes in the Corridor generally terminate at Metrorail stations. Fares range from \$1.00 for locally subsidized local routes (24T) to \$3.00 for express routes (5A Dulles Express).

In 2003, WMATA conducted the Regional Bus Study to identify improvements needed in support of ridership growth. This analysis determined that current weekday service and coverage is good in urban areas and the inner suburbs but in need of expansion in the outer suburbs. Key improvements recommended for the urban areas and inner suburbs included measures to alleviate crowding and increase/expand hours of service. Expansion of existing service and expansion into new markets was recommended for the outer suburbs.

Recommendations to serve the diverse needs of the region included a hierarchy of services ranging from more flexible demand-responsive neighborhood service using smaller vehicles to a network of high performance service using larger buses operating with some priority and on at least some dedicated lanes. Improvements to service within and to regional activity centers and bus service designed to relieve crowding on rail lines were also recommended.

Because many of the recommendations included in the Regional Bus Study were at a fairly general level, WMATA conducted a Phase 2 Study to conduct detailed analysis of four transit corridors, one of which included the Orange Line. The purpose of the study was to develop a comprehensive program of improvements such as running way improvements and passenger facility improvements for new express bus services. Six new routes (called Metro Support Routes) were proposed to relieve crowding on the Orange Line by providing additional transit capacity in the form of express buses operating between park-and-ride locations and areas in the urban core (northwest Washington, D.C. and Pentagon/Crystal City).

Ridership projections for the six routes defined showed that approximately 4,600 daily riders would use the service, diverting 3,700 riders from the Orange Line and adding approximately 900 new transit riders. This translates to approximately 770 riders per route and a load of 51 riders per trip (assuming over the road coaches with 57 seats). Diversion of 3,700 riders from the Orange Line equates to approximately 31 rail cars (or five 6-car trains) of capacity gained. The study also detailed the running way and signal improvements and passenger facilities that would be needed to support the studied service improvements.

B. Arlington Transit (ART)

Arlington Transit provides local service in Arlington County, supplementing Metrobus service with smaller, neighborhood-friendly vehicles and providing access to Metrorail and Virginia Railway Express (VRE). Arlington's services range from fixed route local bus service to small, peak-hour only circulator service. Regular one-way fare is \$1.35, with discounts available for senior citizens, teens, SmartTrip users, and passengers transferring from other services.

C. Fairfax Connector

One of Virginia's largest bus service providers, Fairfax County's Fairfax Connector operates a number of local bus routes throughout the county, as well as express bus service to Orange Line Metro stations and activity centers throughout Washington, D.C., Arlington, Alexandria, and Tysons Corner. Both local and express buses serve the network of park-and-ride facilities. Regular one-way fares range from \$1.00 for local routes to \$3.00 for express routes.

Fairfax County is in the process of constructing the West Ox Bus Operations Center, a new bus operations facility near the intersection of West Ox Road and U.S. 29 that will be shared by Fairfax Connector and WMATA. Phase 1 of the project, scheduled for completion in Fall 2008, will accommodate a fleet of 75 Fairfax Connector vehicles and 100 Metrobuses.

Fairfax County is also in the process of developing a comprehensive ten-year plan for bus service in the county, including both Fairfax Connector and Metrobus.

D. CUE

The City of Fairfax operates the four-route CUE bus system, which provides regularly scheduled, daily service to George Mason University, to shopping centers and other locations within the City of Fairfax, as well as feeder service to the Vienna/Fairfax-GMU Metro station.

Regular fare is 75¢. Elementary, intermediate and high school students, senior citizens (age 60 and older), and persons with disabilities ride for 50¢, and GMU students and personnel and children age three and younger ride free.

E. Omni Ride

PRTC's OmniRide system provides weekday commuter bus service from locations throughout Prince William County to destinations in Washington, D.C., Arlington, Alexandria, Falls Church, and Vienna, as well as all-day "Metro Direct" feeder service to the Franconia-Springfield and

West Falls Church Metrorail stations. Regular one-way fare from Northern Virginia to Washington, D.C. is \$5.50, with various discounts available for multi-trip and SmartTrip pass holders. The regular one-way Metro Direct fare to or from the Metro station is \$2.50.

F. Loudoun County Transit

Loudoun County Transit operates a commuter-focused peak period bus service from park-and-ride lots in Loudoun County to the West Falls Church Metrorail station and destinations in Arlington and Washington, D.C. Loudoun County Transit also provides a “Reverse Commute” schedule from the West Falls Church Metrorail station to employment sites in Eastern Loudoun County, including Verizon, AOL, Dulles North Transit Center, Janelia Farm, INOVA Loudoun Hospital, the Town of Leesburg, and employers in the Beaumeade Circle area. Fares range from \$7.00 for commuter service to Washington, D.C. (\$6.00 with SmartTrip) to \$2.00 for Metrorail feeder service.

5.1.4 Paratransit Service

Six transit providers provide paratransit and on-demand service in the Corridor: WMATA, Arlington County, the City of Falls Church, the City of Fairfax, Fairfax County, and PRTC:

- WMATA's MetroAccess program provides paratransit in Fairfax and Arlington Counties. Services include curb-to-curb service in areas served by participating agencies, including Fairfax Connector, Cue and ART. The fare for MetroAccess ranges from \$2.50 to \$6.50.
- Arlington County operates Specialized Transit for Arlington Residents (STAR) as an alternative to MetroAccess. STAR operates by contracting with local taxi services. Fares range from \$2.50 for trips within Arlington to \$7.00 for trips outside the Beltway.
- The City of Falls Church offers Fare Wheels program in the cities of Falls Church and Fairfax, and Arlington County. Fare Wheels allows participants to use redeemable coupons for up to \$35 per month to pay for transportation services. Individuals may choose from among a pool of participating transportation providers, selecting the one that best meets their needs. This service is offered to residents of the City of Falls Church that are at least 62 years of age or permanently disabled, with an annual incomes less than \$30,000.
- City Wheels is operated by the City of Fairfax. The average passenger fare is \$2 (two times the CUE bus fare).
- Fairfax County's Fastran service offers door-to-door Paratransit service as well as mid-day dial-a-ride (demand responsive) service. Dial-a-ride fares are paid on a cash basis and range from \$1 to \$3 per trip. Trips are scheduled by the participant through Fastran.
- PRTC offers OmniLink, a weekly local demand response service in the Prince William County region. OmniLink offers service to defined stops as well as scheduled stops requested by riders.
- Virginia Regional Transit provides door-to-door, advance registration, and limited on-demand transportation within Loudoun County, in Leesburg and the Sterling area, including Sterling, Sterling Park, Sugarland Run, CountrySide, and Cascades.

5.1.5 Other Services

Commuter information and services, such as ride sharing, are offered by all of the counties in the study area. Further, MWCOC offers the Commuter Connections program to the entire Washington region. Commuter Connections provides information about commuting options to offer workers choices in how they get to work. They also help employers establish commuting

benefits and assistance programs, including telework/telecommute programs, for their employees.

5.2 RELATED FACILITIES

Transit related facilities such as park-and-ride lots, intermodal centers, and maintenance and storage facilities are described in the following sections.

5.2.1 Park-and-Ride Lots and Intermodal Centers

Based on the 2003 VDOT Northern Virginia Park & Ride Lot Feasibility Study, the I-66 Corridor currently has 20 publicly- or privately-owned park-and-ride lots, excluding those located at either Metrorail or VRE stations. Park-and-ride lots are also provided at four Metrorail stations and three VRE stations. The VDOT study collected one-day usage rates at the non-rail-station lots and found that while usage varied widely (from 0 percent to 88 percent), the 3,789 spaces considered in the study had a utilization rate of 24.7 percent. Table 5-6 provides location, ownership, capacity, and cost data for park-and-ride lots identified in the I-66 Corridor. The locations of these lots are shown in Figure 5-4.

TABLE 5-6: PARK-AND-RIDE LOTS AND INTERMODAL CENTERS WITHIN THE I-66 CORRIDOR

Name	Owned By	Cost	Services	Spaces	Usage Rate
Ballston Public Parking Garage	Arlington County	\$8.00	Metrobus, Carpool, Vanpool	500	20% ¹
Broad Run/Airport Rail Station	VRE	Free	VRE	696	>100% ²
Centreville (Stone Road – U.S. 29)	Fairfax County	Free	Metrobus, Carpool, Vanpool	372	84% ¹
Centreville United Methodist Church	Private	Free	Metrobus, Carpool, Vanpool	144	88% ¹
Dunn Loring – Merrifield Metro Station	WMATA	\$4.50	Metrobus, Fairfax Connector, Carpool, Vanpool	1,319	107% ³
East Falls Church Metro Station	WMATA	\$4.50	Metrobus, Carpool, Vanpool	422	117% ³
Fair Oaks Mall	Private	Free	Fairfax Connector	150	13% ¹
Fairlanes Bowling Center (AMF Centreville Lanes)	Private	Free	Metrobus, Carpool, Vanpool	35	17% ¹
Fairfax County Government Center	Fairfax County	Free	Metrobus, Carpool, Vanpool	170	37% ¹
Greenbriar Park	Fairfax County	Free	Metrobus, Fairfax Connector, Carpool, Vanpool	60	10% ¹
Kutner Park	City of Fairfax	Free		15	0% ¹
Manassas Mall	Private	Free	OmniRide, Carpool, Vanpool	217	11% ¹
Manassas Park Rail Station	VRE	Free	OmniLink, Carpool, Vanpool	600	>90% ²

TABLE 5-6: PARK-AND-RIDE LOTS AND INTERMODAL CENTERS WITHIN THE I-66 CORRIDOR

Name	Owned By	Cost	Services	Spaces	Usage Rate
Manassas Rail Station	VRE	Free	OmniLink, Carpool, Vanpool	348	>100% ²
North Street Parking Lot	City of Fairfax	n.a.		22	50% ¹
Nottoway Park	Fairfax County	Free		14	57% ¹
Poplar Tree Park	Fairfax County	Free	Metrobus, Carpool, Vanpool	279	1% ¹
Portsmouth	VDOT	Free	OmniRide, Carpool, Vanpool	605	12% ¹
Sipan	Private	Free		46	0% ¹
St. Paul Chung Catholic Church	Private	Free	Metrobus, Carpool, Vanpool	100	23% ¹
Stringfellow Road	VDOT	Free	Metrobus, Carpool, Vanpool	385	24% ¹
Sully Station	Private	Free	Fairfax Connector, Carpool, Vanpool	38	13% ¹
Truro Episcopal Church	Private	Free		46	7% ¹
Vienna/Fairfax – GMU Metro Station	WMATA	\$4.50	Metrobus, Fairfax Connector, CUE, Carpool, Vanpool	3,643	100% ³
Virginia Gateway	Private	Free	OmniRide, Carpool, Vanpool	125	27% ¹
Washington-Lee	Arlington County	n.a.		28	0% ¹
West Falls Church-VT/UVA Metro Station	WMATA	\$4.50	Metrobus, Fairfax Connector, OmniRide, Carpool, Vanpool	1,062	103% ³

Sources: ¹ VDOT Park-and-Ride Study, 2003; ² VRE Strategic Plan, Phase 2 Report, May 2004; ³ WMATA Station Access And Capacity Plan, April, 2008

5.2.2 Maintenance and Storage Facilities

The success of the transit services in the Corridor has driven a continual need for new and/or expanded bus and rail maintenance and storage facilities. Bus garage expansions and new facilities are needed throughout the Corridor to support existing and planned bus service expansions. The *Metrorail Vehicle Fleet Management Plan* (May 2007) shows that a minimum of 210 maintenance spaces are required with the delivery of new cars in FY 2014 and the remainder of the Dulles cars in FY 2015. The Fleet Plan has identified the need for an additional 18 maintenance bays. The exact yard expansion locations are not specifically located, although there is a proposed shop expansion at Alexandria Yard.

VRE is currently operating at capacity at their portion of the Ivy City yard and near capacity at the yards at the end of the Manassas Line. The number of locomotives and railcars that VRE can operate on any given day is constrained by its capacity at Ivy City. No additional trains or even

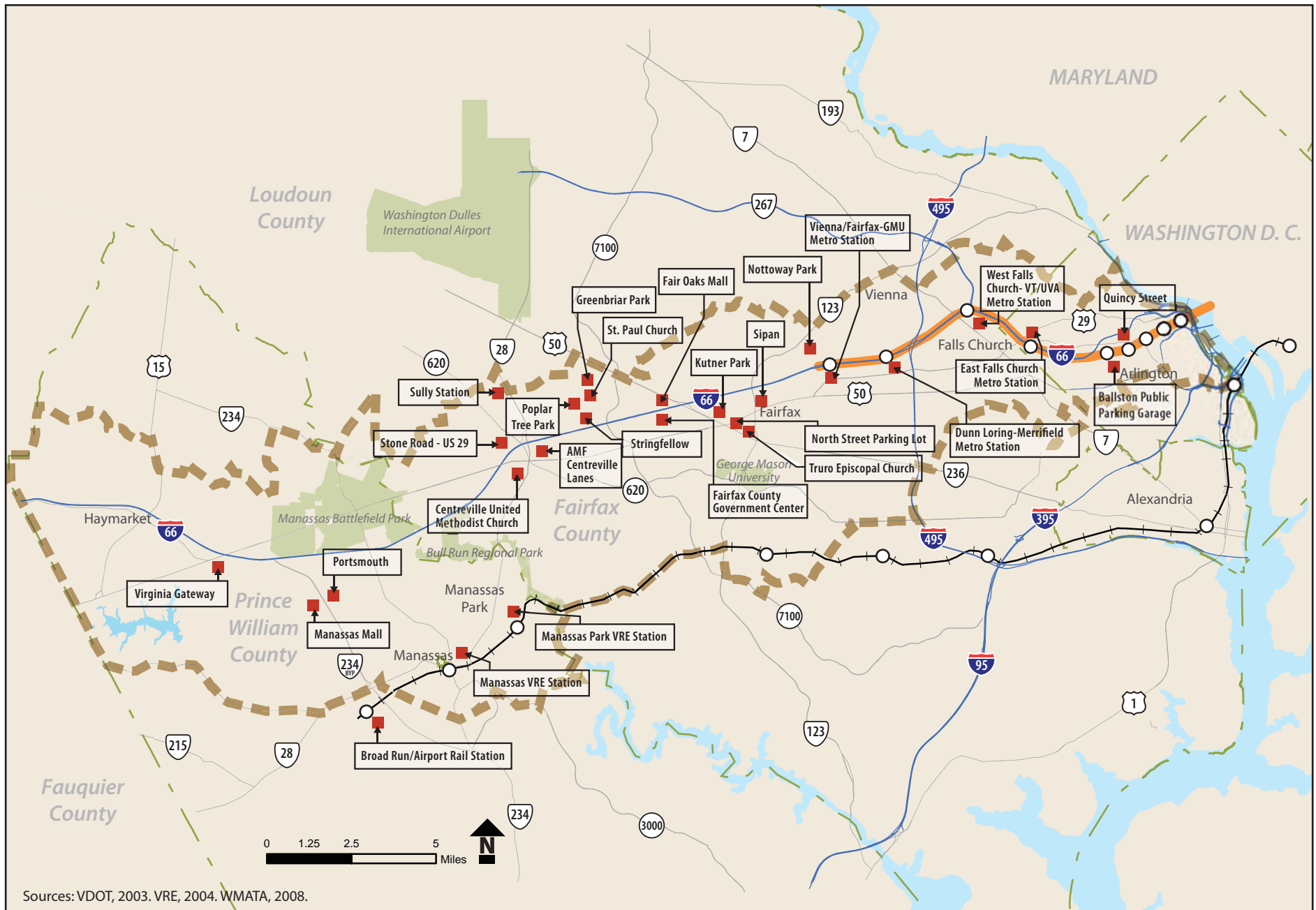


FIGURE 5-4

Park-and-Ride Lots

I-66 CORRIDOR TRANSIT STUDY
(INSIDE AND OUTSIDE THE BELTWAY)

additional cars can be run until additional space to store inbound trains from the morning service can be identified (VRE, 2004). Further, if an extension to Gainesville or Manassas occurs, a new yard would need to be constructed to support it.

5.3 TRAVEL PATTERNS AND TRANSIT DEMAND

Travel patterns within the corridor tend to follow land use trends as the corridor emerges from the dense mixed used centers in Arlington County into the suburban areas of Fairfax County and the emerging employment centers in Prince William County. According to the data developed during the 2003 MTES:

- Transit usage is highest within the urban core and mixed use centers; however, there is evidence that market penetration of long-range transit services (the proportion of long-range commuters using transit) is substantial.
 - Less than 1 percent of study area trips originating and terminating in Fairfax and Prince William Counties used transit; however,
 - Approximately 29 percent of the trips from these areas to Washington D.C. used transit
- The ratio of total trip productions to total trip attractions is slightly greater than one in Fairfax and Prince William Counties, indicating that while the majority of trips remain within these areas, there are surplus trips which are heading east towards the urban core.
- The ratio of home-based work productions to home-based work attractions approaches 2.0 for the areas of Manassas and Haymarket, indicating that these areas are “exporting” a large portion of their peak hour traffic to other areas (most likely the urban core, Tysons Corner, and the Pentagon). Therefore, there is a large demand for medium-to-long distance travel from the western portion of the study area.

In this context, transit services to the urban core can be expected to remain a major part of the solution to mobility needs in the I-66 Corridor. As the study proceeds, a more complete analysis of transit trip patterns using the most recent MWCOG forecasts will need to be undertaken to further define potential travel markets and transit routes, particularly in the middle and western portions of the Corridor.

An initial assessment of travel patterns and demand within the corridor and how well this demand is served by current transit services is included below.

5.3.1 Mixed Use Centers – Arlington County

The I-66 Corridor within Arlington County is largely built-out and consists of mixed-used centers located at Rosslyn, Clarendon/Courthouse, and Ballston/Virginia Square. These areas are characterized by a mix of high-density land uses focused around the Metrorail Orange Line stations. These centers clearly benefit from the high-quality, frequent service of the Orange Line, as well as from the connectivity provided by a traditional grid road network. Transit service includes several Metrobus routes and local services providing good connectivity to Metrorail, the urban core, regional services (VRE, MARC), and major transportation facilities (Union Station, Ronald Reagan International Airport, Dulles International Airport).

Over the last 20 years, the transit-oriented redevelopment in the Rosslyn-Ballston Corridor has resulted in significant changes in travel patterns. Travel on east-west arterial streets and highways has dropped significantly and the percentages of workers taking transit or walking to

work has increased dramatically. For example, between 1996 and 2006 traffic volumes on Wilson Boulevard and U.S. 29 (Lee Highway) have dropped by 15.8 percent and 14.1 percent, respectively. Approximately 39 percent of those who live in the corridor take transit to work and another 10 percent walk (Arlington County, 2007). In a survey of daily trips by development type, WMATA found that 34 percent of office workers within the corridor use transit (WMATA, 2005). However, travel demand on north-south roadways such as Glebe Road and George Mason Drive has continued to increase somewhat.

On regional facilities such as I-66, substantial growth in traffic volumes has been observed in the off-peak or “reverse commute” direction as workers from the core access employment centers in the Rosslyn-Ballston Corridor and travel to Tysons Corner and Dulles Corridor. Traffic in the peak direction on I-66 through Arlington remains at acceptable levels of service in most locations as a result of the HOV restrictions on all travel lanes.

5.3.2 Employment Centers and Suburban Employment Centers – Fairfax County

The I-66 Corridor within Fairfax County includes the employment center of Merrifield/Dunn Loring and the suburban employment centers of Fairfax Center, and the City of Fairfax-George Mason University (GMU). These areas are largely built out with lower density, suburban development.

The Merrifield/Dunn Loring suburban center benefits from direct service from the Orange Line’s Dunn Loring-Merrifield Station. Fairfax Center and the City of Fairfax-GMU, however, are served by bus routes primarily oriented towards the Vienna Metrorail Station. Further, most bus service occurs during the peak period, with mid-day service at long intervals or not at all. While there are several major north-south arterials, local roadways tend to be more suburban in character, limiting the ability to maintain bus services that provide direct service to the centers of neighborhoods. In general, it appears that a number of travel markets are unserved or underserved. The large regional roadway network does provide opportunity for new regional bus service to connect the Merrifield/Dunn Loring, Fairfax Center, and City of Fairfax-GMU centers with other regional activity centers.

A program to expand bus services throughout their service area was studied in detail by WMATA as part of their Regional Bus Study. Ridership increases of 64 percent in the outer Virginia suburbs and 24 percent in the inner Virginia suburbs were projected based on implementation of new local routes; expansion of coverage/neighborhood circulators and shuttles; restructuring existing service (e.g., to expand access for residents and for reverse commuters, add weekend and evening service, and reconfigure/restructure routes); and proposed facility improvements (signal prioritization, intersection improvements, additional bus garage capacity, bus shelters, and new park-and-ride lots).

Further, express bus routes between park-and-ride lots at the Fairfax County Government Center, Stringfellow Road, and Poplar Tree and downtown Washington, D.C. and/or Pentagon City/Crystal City were studied in detail as part of the Regional Bus Study Phase 2. These routes were projected to attract a substantial number of riders and provide real capacity relief on the Orange line by diverting a significant number of trips during peak periods.

5.3.3 Emerging Employment Centers – Prince William County

The I-66 Corridor in Prince William County includes three emerging employment centers: Bull-Run Sudley, Innovation, and Gainesville. These areas are projected to continue to grow rapidly over the next 25 years, but will have more than 50 percent of their development potential remaining in 2030. Growth in these areas has been significantly faster than their more

established counterparts to the east. Transit services to these areas is focused almost entirely on commuter services to the urban core (both on VRE and commuter buses). Some limited local circulator bus service is also available in and around Manassas. Significant portions of both the roadway and transit networks in this area are expected to expand as both the population and employment bases of the area increase.

While the population and employment of the study area are increasing and development is expanding westward, transit coverage has not been able to keep pace. The geographic coverage of transit services has not changed significantly in the last eight years, despite numerous studies that have identified the potential for service expansions. As the population and employment in the I-66 Corridor increase, the demand for increased transit services will increase.

6.0 NEXT STEPS

This report documents the first step in the study process for the I-66 Corridor Transit/TDM Study. It provides an inventory of existing and planned transportation programs and services in the I-66 Corridor including their performance. Population demands and mobility needs in the corridor far outstrip the capacity of the existing and programmed transportation infrastructure. As has been demonstrated in the past, implementing solutions to meet the corridor's needs will require innovation, fiscal responsibility, and political will.

The immediacy of the issues facing the corridor call for short- and mid-term solutions that can meet existing needs and work towards building a larger market for transit services in developing areas. At the same time, there is a need to map out a long-term vision for the corridor that can be used by state and local decision makers to build support and identify funding for more significant long term investments in the Corridor.

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APPENDIX A
SUMMARY OF MTES ALTERNATIVES

A. SUMMARY OF MTES ALTERNATIVES

This appendix summarizes the alternatives evaluated and recommended for further consideration by the I-66 Multimodal Transportation and Environment Study (MTES).

VDOT and DRPT jointly began the MTES in 2001. The purpose of the study was to continue the planning process for the improvements recommended at the conclusion of the I-66 Major Investment Study (MIS) in 1999. More detailed studies in support of the Draft EIS were in progress when the study was terminated in 2003.

The MIS presented a Recommended Transportation Investment Strategy that included the following elements:

- Extension of Metrorail from the Vienna terminus to Centreville with stations spaced approximately every two miles at Chain Bridge Road (Route 123), Fair Oaks Mall/Government Center, Stringfellow Road, and Centreville;
- Two-lane, reversible, barrier-separated HOV facility from just west of the I-66 Interchange with the Beltway to the proposed Tri-County Parkway;
- One additional general purpose lane in each direction between the Beltway and U.S. 50 as well as a full-width shoulder; and
- Expanded peak period bus transit and as well as off-peak services; skip stop service on Virginia Railway Express (VRE), and shorter headways (3 min.) between Metro trains at the Vienna/Fairfax-GMU Station.

Because the MTES study was terminated prior to completion, limited documentation is available on some alternatives. Available documentation does not provide any further detail regarding proposed highway improvements. However, prior to termination the MTES project completed preliminary evaluations of the Bus Rapid Transit (BRT) alternative and Metrorail station locations to be carried forward.

A.1 BUS RAPID TRANSIT

The *Draft Bus Rapid Transit White Paper: Service Design Options* report dated June 2002 documented the evaluation of six service options for BRT. The primary differences between the options considered were the nature of service provided by buses prior to beginning travel within the I-66 highway corridor and the presence or absence intermediate stations between the point of entry to I-66 and the eastern terminus at the Vienna/Fairfax-GMU Metro Station. Briefly, the six service options reviewed were:

- Option 1: BRT in Exclusive Guideway – this option would most closely resemble an extension of the existing Orange Line. BRT vehicles would operate within the I-66 median in an exclusive guideway, with intermediate stops constructed the median at station locations consistent with the proposed extension of the Orange Line to Centreville. To access the system, passengers must either drive to a park and ride lot at a station or transfer from a connecting bus route.

- Option 2: BRT Operating in HOV Lanes – this option would use the existing HOV lanes for travel, stopping at intermediate curbside stations consistent with the proposed extension of the Orange Line to Centreville. Assuming the HOV lanes remain in the center of the roadway, BRT vehicles would be forced to merge in and out of traffic to access stations. BRT vehicles would not leave I-66 except to turn around at the terminus; therefore, to access the system, passengers must either drive to a park and ride lot at a station or transfer from a connecting bus route.
- Option 3: BRT Providing Express Community Service – this option provides BRT service that originates within local communities, making limited stops before accessing the I-66 HOV lanes for non-stop service to the east terminus. This design provides route flexibility to adapt to changing ridership and reduces transfers. However, the numerous individual routes required within communities would limit the service frequency and the absence of intermediate stops would reduce ridership.
- Option 4: BRT Express Community Service with Intermediate Stops on I-66 – this service design is similar to Option 3 in that it would provide express service to/from local communities. With this option, however, buses would also make intermediate stops at major transfer points along I-66.
- Option 5: BRT Providing Local Community Service – this option would provide on/off service in local communities using regular stops prior to operating non-stop express to the terminus. The design is similar to Option 3 but provides local on/off service in the community as opposed to limited stop service.
- Option 6: BRT Providing Local Service with Intermediate Stops on I-66 – this design option would provide local stops within the community, similar to Option 5, but would also stop along I-66 at major transfer points.

The white paper provides a Low-Medium-High evaluation of each against a series of Measures of Effectiveness shown below.

BRT Service Option	Measure of Effectiveness				
	Travel Time	Schedule Reliability	Connectivity to Local Service	Operational Complexity	Ridership Potential
#1 – Exclusive bus lanes with station stops	Low	High	Low	Low	Medium
#2 – Use of HOV lanes with intermediate stops	Low	Medium	Low	Medium	Medium
#3 – Express community service and non-stop to Vienna Station or terminus	Low	Medium	Medium	Low	High
#4 – Express community service with stops on I-66	Medium	Medium	Medium	Medium	High
#5 – Local community service and non-stop to Vienna	High	Low	High	Low	Low
#6 – Local community service with stops on I-66	High	Low	High	Medium	Low

While the white paper does not provide an explicit recommendation, a Decision Chronicle dated July 2002 selected “Option 4: BRT Express Community Service with Intermediate Stops on I-66” as the basis for further BRT alternative development.

A.2 METRORAIL STATION LOCATIONS

Two reports developed during the MTES study – *Technical Memorandum on Maintenance/Storage and Station Site Selection* (November 2002) and *Summary Information – Rail Station and Maintenance Storage Facility Sites* (February 2003) – documented the selection of possible sites for the rail transit stations and rail maintenance/storage facility associated with the extension of the Metrorail Orange Line to Centreville. Four general areas, shown in Figure 1, were evaluated for stations:

- Route 123/Chain Bridge Road
- Government Center/Fair Oaks Mall
- Stringfellow Road
- Centreville (evaluated as both intermediate and end-of-line station)

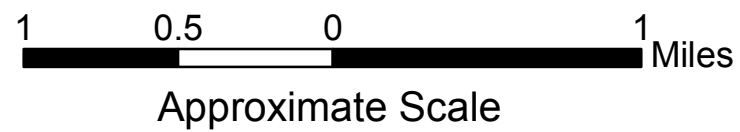
Additional locations were evaluated for an end of the line rail maintenance and storage facility needed to support the extension.

Program requirements were developed for each type of facility and candidate locations were identified and then screened against program compliance, land use compatibility, constructability, traffic, rail transit, and environmental measures of effectiveness. The report narrowed the list of station locations to between one and three sites for each facility. The locations were discussed by the project’s Technical Committee, Local Advisory Committee, and Study Management Team, but the study terminated prior to any final decisions.

The locations recommended for further consideration are described in the table below and shown on the attached figures.

Location	Description	Size (Acres)	Existing Land Use	Comments
Group A – Route 123/Chain Bridge Road				
A4	Phoenix Drive	10.3	Commercial/ Residential	MIS proposed site; Close to area businesses; Located on main road; Good access for local residents; Disrupts new residential neighborhood
A5	Route 123	5.7	VDOT Right of Way	VDOT Property; No residential impacts; As a stand alone site, does not meet program requirements, however it would function as a kiss and ride station with neighborhood access only (no long term parking)
A9	Buckley Street	11.7	Residential	Neighborhood traffic impacts; Disrupts established residential neighborhood; Site’s proximity to the Flint Hill Suburban Center and potential for transit oriented redevelopment

Location	Description	Size (Acres)	Existing Land Use	Comments
Group B – Government Center/Fair Oaks Mall				
B1/B2	Monument Drive East	15.2	Vacant County Property/ Office Building	Vacant parcel B1 was acquired through County proffered development condition; Potential for joint development (B2); Potential conflicts with HOV ramps
B3	Fair Lakes Plaza	18.3	Retail & Medical Building	Potential for joint development; Site exceeds program requirements; Does not conflict with HOV ramps
B1/B6	Government Center	19.1	Under Development – Mixed Use	MIS proposed location; Exceeds program requirements; Promotes transit oriented development; May be too close to Group A stations; Potential conflicts with HOV ramps; Potential conflict with proposed development
Group C – Stringfellow Road				
C1/C2	Stringfellow Road Park and Ride	27.1	Vacant Proffered Parcel; VDOT Park and Ride	MIS proposed location; Exceeds Program Requirements; C1 was reserved by County as a proffered development condition; Rest of same development to the west is under construction
Group D – Centreville End-of-Line Station				
D1	Trinity Center East	37.9	Existing Residential/ Office	Ample size to meet program requirements; Located near businesses and residential; Possible direct access from I-66; Arterial network impacts; I-66 horizontal realignment possible
D4	Braddock/Stone Connector	15.4	VDOT Right of Way and Vacant Land	MIS proposed site; Removed from center of business activity; Potential neighborhood impacts; Potential wetland/floodplain impacts; Good access to residential areas
Group D – Centreville Intermediate Station				
D1	Trinity Center East	37.9	Existing Residential/ Office	Ample size to meet program requirements; Located near businesses and residential; Possible direct access from I-66; Arterial network impacts; I-66 horizontal realignment possible
Group E – Storage/Maintenance Facility and End-of-Line Station				
E1	Izaak Walton League	103.5	Open Space	Exceeds Program Requirements for Station & Maintenance Facility; Approximately 2 miles from Group D station location; Potential to combine with end-of-line station; Zoning does not permit special exception use
E5	Compton Road West	62.0	Existing Residential	Minimal wetland/floodplain issues; Rail access is reasonable; Approximately 3 to 4 miles from Group D station location; Zoning does not permit special exception use



10/2/2002

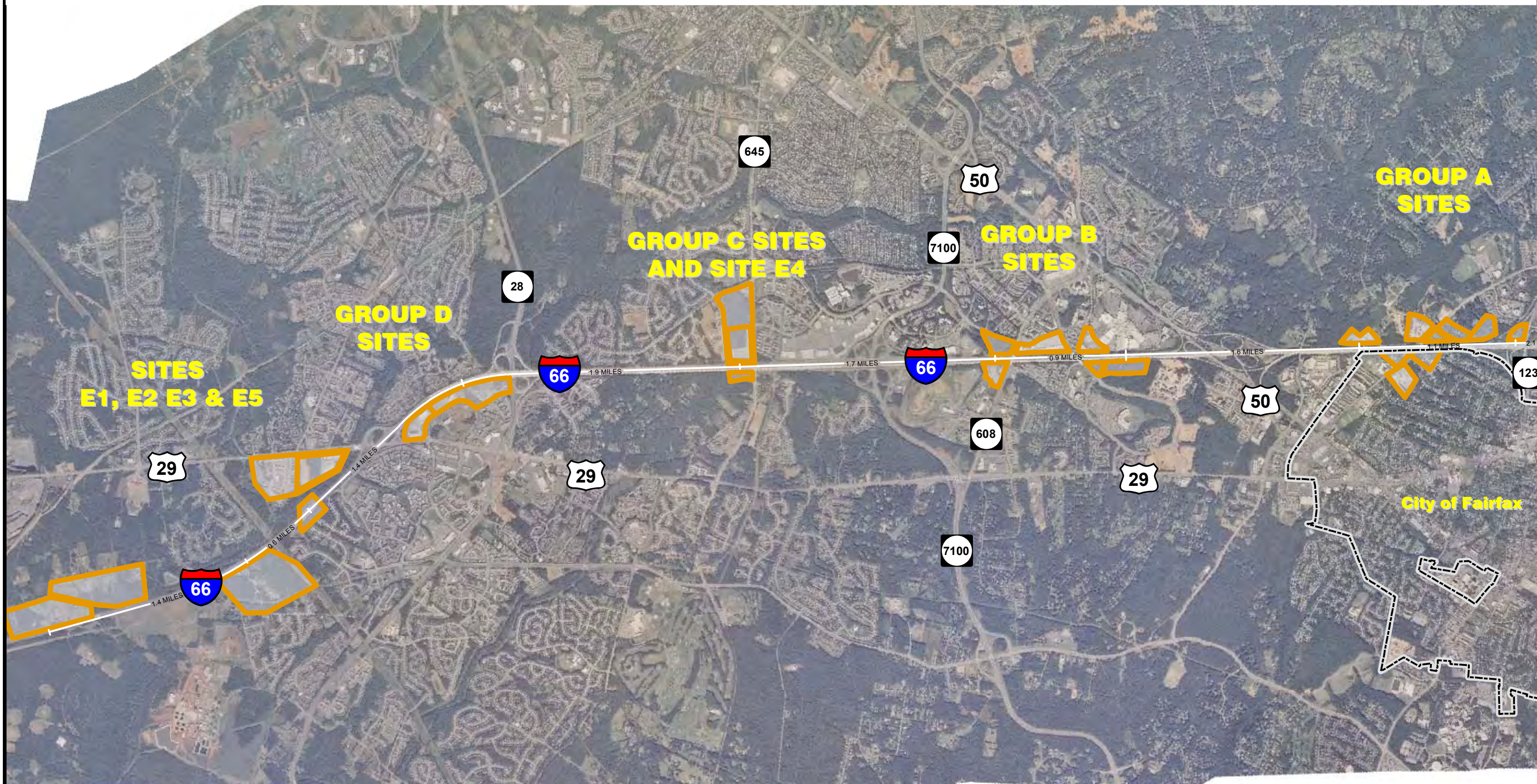
MULTIMODAL TRANSPORTATION
& ENVIRONMENTAL STUDY



Figure 1

Site Selection Overview

Aerial Photography Dated September 2000





Legend

- Wetlands
- 100 Yr Flood
- Parks
- Under Construction
- Major Bus Interface
- Park & Ride Lot

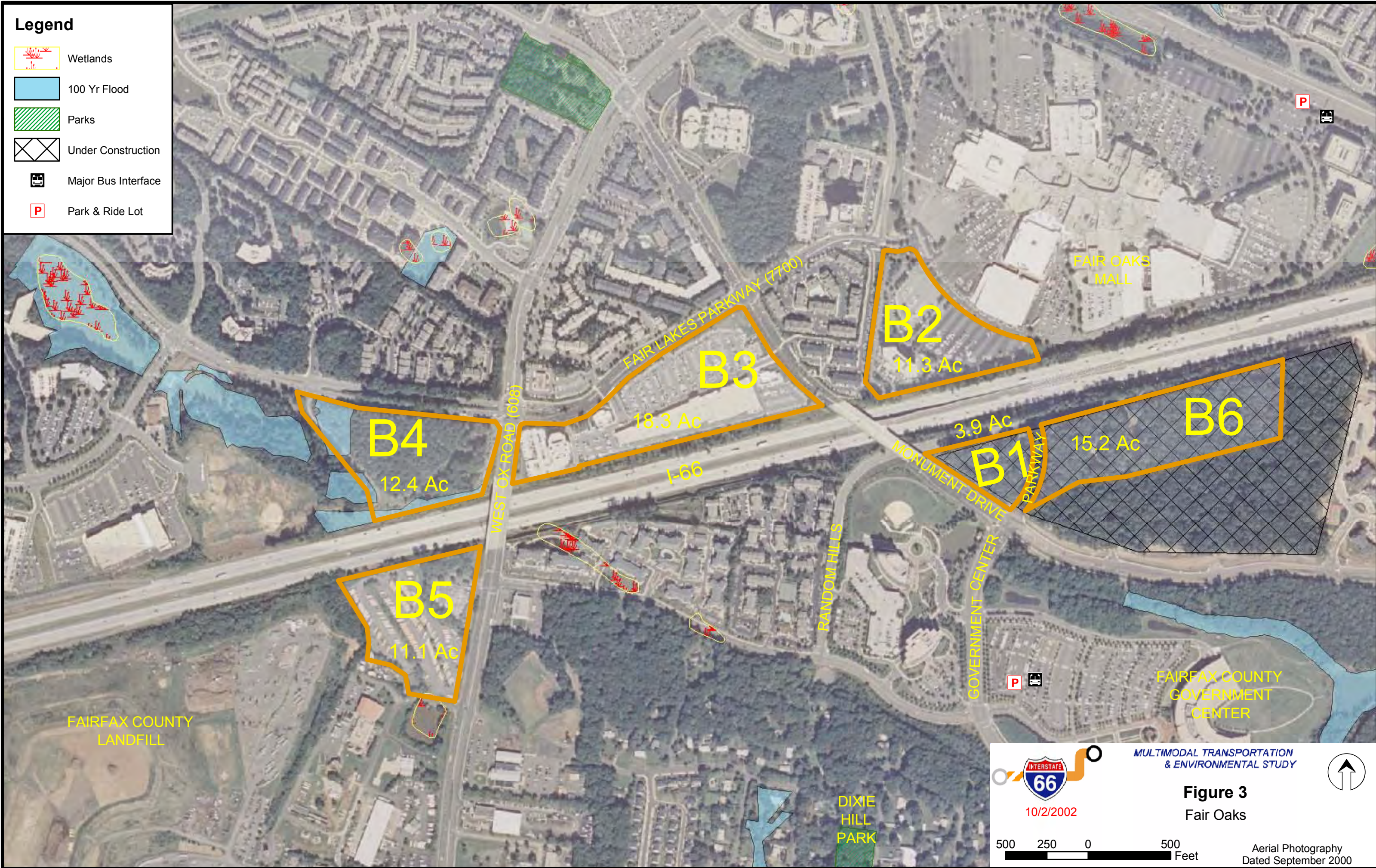
MULTIMODAL TRANSPORTATION & ENVIRONMENTAL STUDY

Figure 2







10/2/2002 Chain Bridge Rd/Jermantown Rd

500 250 0 500 Feet

Aerial Photography Dated September 2000



Legend

-  Wetlands
-  100 Yr Flood
-  Parks
-  Under Construction
-  Major Bus Interface
-  Park & Ride Lot

MULTIMODAL TRANSPORTATION
& ENVIRONMENTAL STUDY







Figure 3
Fair Oaks


500 250 0 500
Feet

Aerial Photography
Dated September 2000



Legend


-  Wetlands
-  100 Yr Flood
-  Parks
-  Under Construction
-  Major Bus Interface
-  Park & Ride Lot



10/2/2002

MULTIMODAL TRANSPORTATION
& ENVIRONMENTAL STUDY

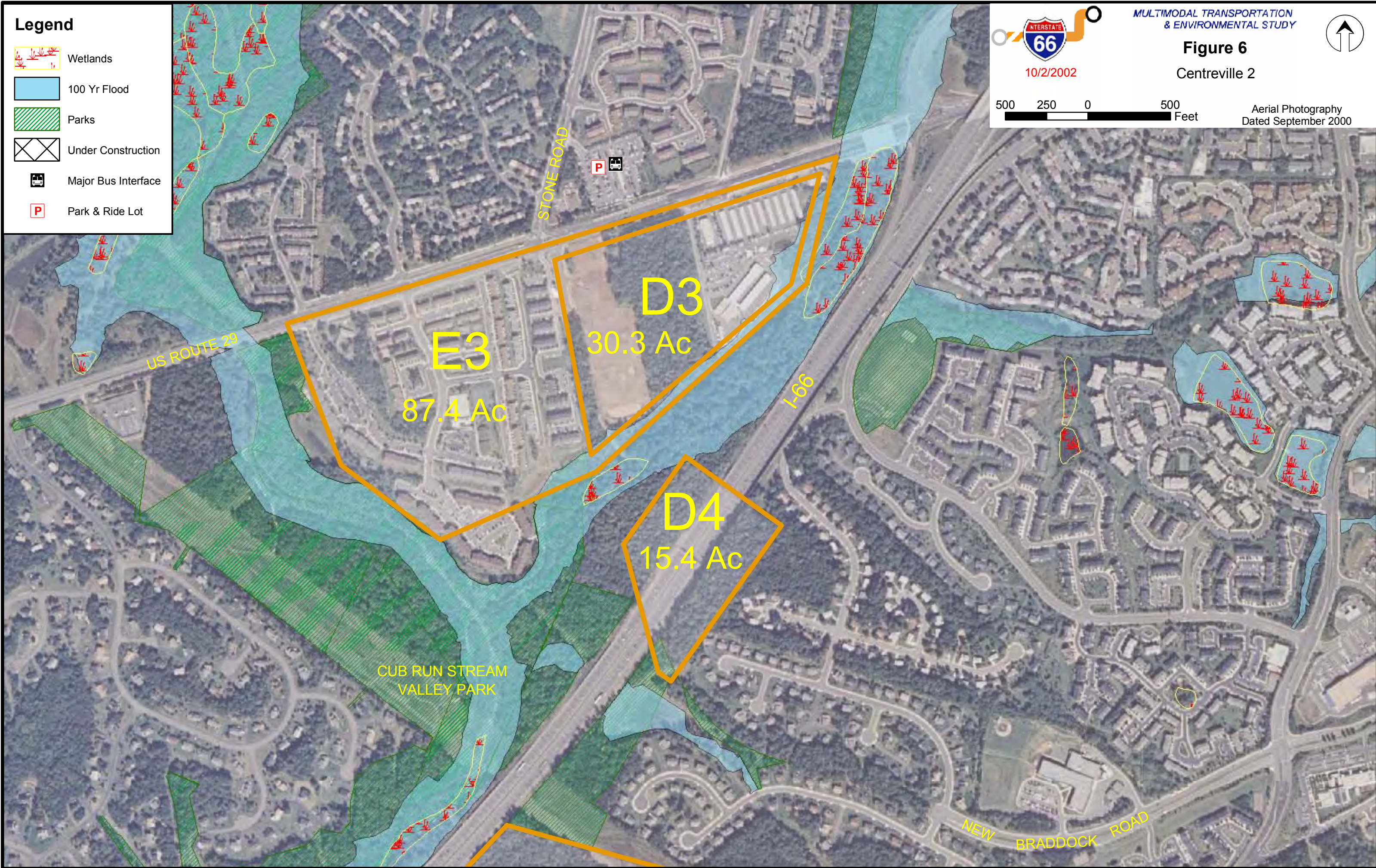
Figure 4
Stringfellow Road

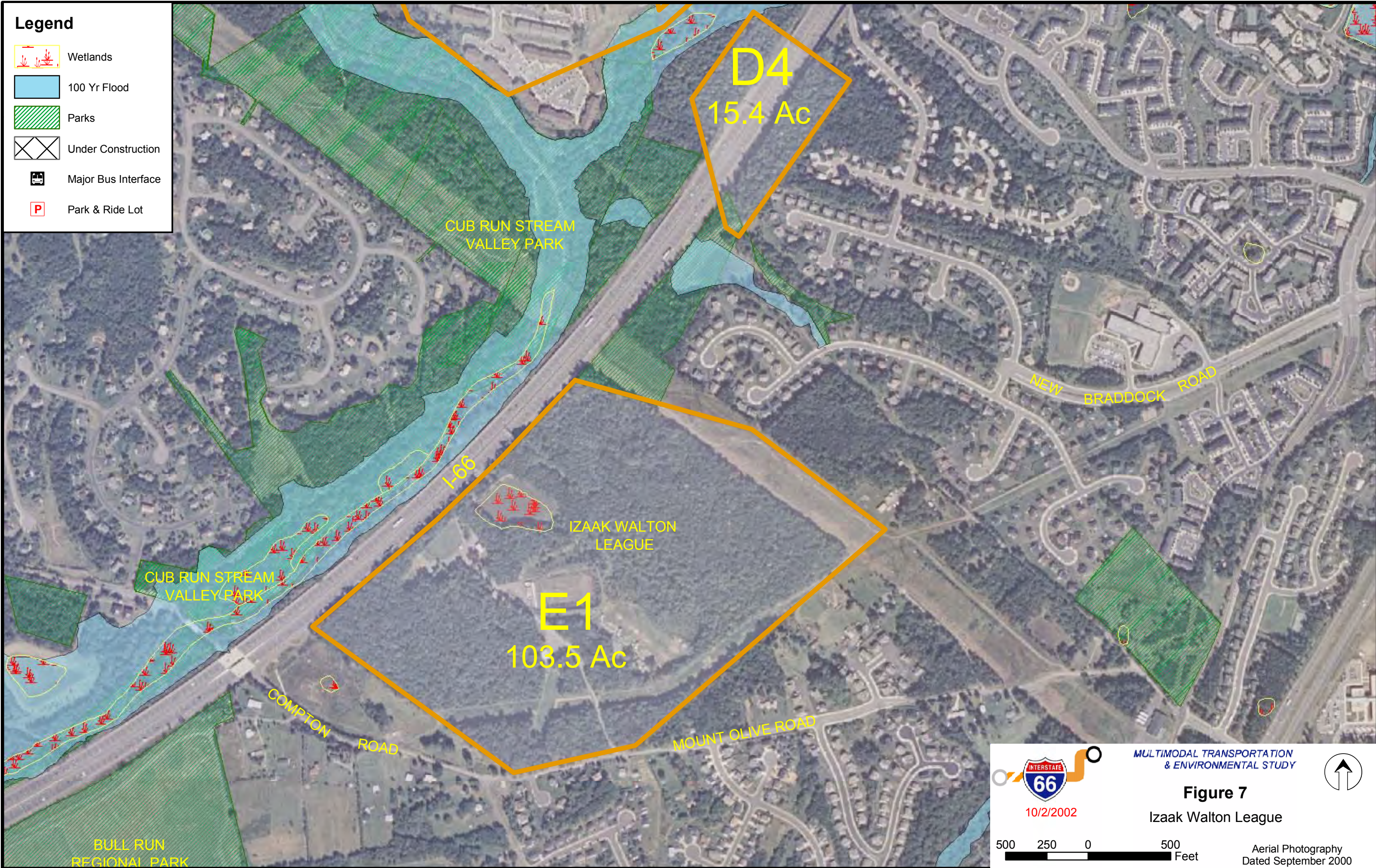



500 250 0 500
Feet

Aerial Photography
Dated September 2000










10/2/2002

MULTIMODAL TRANSPORTATION
& ENVIRONMENTAL STUDY

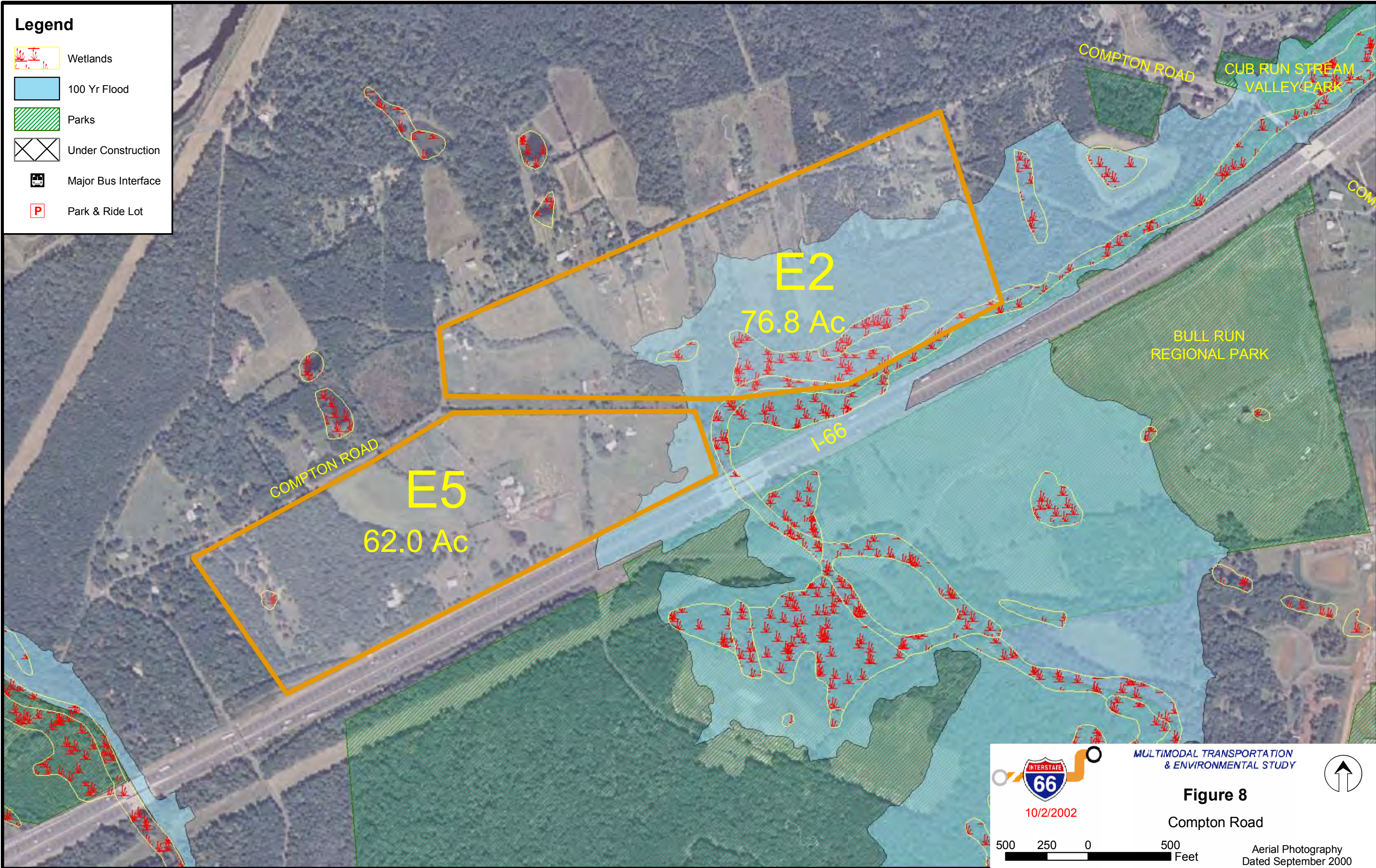
Figure 7

Izaak Walton League









500 250 0 500 Feet

Aerial Photography
Dated September 2000




Legend

-  Wetlands
-  100 Yr Flood
-  Parks
-  Under Construction
-  Major Bus Interface
-  Park & Ride Lot

E2
76.8 Ac

E5
62.0 Ac



10/2/2002


MULTIMODAL TRANSPORTATION
& ENVIRONMENTAL STUDY

Figure 8

Compton Road

500 250 0 500
Feet

Aerial Photography
Dated September 2000



APPENDIX B

REGIONAL BUS STUDY – PHASE 2 FINDINGS (METRO SUPPORT ROUTES)

Preliminary Recommendations – Metro Support Services

A. *Service Improvements*

As noted earlier in the corridor descriptions in Section 3, many Orange Line trains to and from Vienna are currently over capacity in the peak period, with little short term opportunity to add capacity to the line through longer trains or more frequent service. In addition, Orange Line station parking lots are full and little opportunity is available to increase parking capacity at many of the stations. The focus of the proposed Metro Support Routes described in greater detail below is to relieve crowding on the Orange Line by providing additional transit capacity in the form of park and ride lot express buses that would run parallel to the Orange Line directly into downtown Washington (and in one instance to Pentagon City/Crystal City). The specific objectives of the parallel service are to:

- Provide express bus options to serve Orange Line demand with no additional parking capacity;
- Relieve overcrowding on Metrorail;
- Provide bus travel times competitive with rail; and
- Provide an attractive frequency of service.

Further, the proposed services were developed based on three key foundations:

- The new services would be operated on highways, particularly on HOV lanes;
- Services that currently terminate at Metrorail stations would be extended directly into downtown; and
- Some downtown circulation service would be provided through the use of the express buses.

A total of six new express routes have been proposed for the Orange Line corridor in northern Virginia, with five of these services operating directly into downtown and one serving Pentagon City/Crystal City rather than downtown Washington.

The specific Metro Support routes identified in the preliminary recommendations are:

- Herndon-Monroe Park and Ride to Downtown
- West Falls Church Metrorail Station to Downtown;
- Fairfax Government Center Park and Ride to Pentagon City/Crystal City;
- Fairfax Government Center Park and Ride to Downtown;
- Stringfellow Road Park and Ride to Downtown; and
- Poplar Tree Park and Ride to Downtown.

The services are shown in Figure 15.

Service Levels – Each of the Metro Support routes would have a comparable span of service and headways:

- Span of Service and headways – all services
 - Morning Peak 6:00 am to 8:30 am – 10 minutes
 8:30 am to 9:00 am – 15 minutes
 - Afternoon Peak 4:00 pm to 6:30 pm – 10 minutes
 6:30 pm to 7:00 pm – 15 minutes

Downtown Routing – The Metro Support trips would take a routing through the northern portion of downtown, with buses entering downtown via the Theodore Roosevelt Bridge (a study is currently being completed to examine the feasibility of adding HOV lanes to the bridge. This would further support this service). Once in downtown the trips would run north on 27th Streets to K Street (an alternative routing would be E Street to 18th Street to K. 27th Street was chosen to provide service to George Washington University and to avoid congestion). Once on K Street the service would run on the surface around Washington Circle to 14th and then return to Virginia via 14th Street and Constitution Avenue (see Figure 16). Downtown stops would be located at:

- Foggy Bottom/Washington Circle;
- 17th and K, and;
- McPherson Square.

An alternative that may be considered during implementation would be an extension of some trips to Union Station. If this extension is considered, proposed stops would be located at:

- 13th Street and K;
- Mount Vernon Square; and
- Union Station.

Stops on the service from Fairfax Government Center to Crystal City would be located at:

- Pentagon City Metro Station
- Crystal City Metro Station; and
- Crystal Drive and 23rd Street.

Estimated Ridership – It is estimated that the six routes described in the previous section would attract approximately 4,600 daily riders (9,200 daily

boardings) with approximately 3,700 riders (7,400 boardings) diverted from the Orange Line and approximately 900 new riders (1,800 boardings). This translates into approximately 770 riders (1,540 boardings) per route and a load of 51 riders per trip (assumes over the road coaches with 57 seats).

A diversion of 3,700 trips in each peak period translates into approximately 31 cars, or five, six car, trains of capacity. If all Metro Support services were implemented, there would be real potential for capacity relief along the Orange Line.

During planning and implementation of the Metro Support services, coordination will be required to determine integration with the 12 services, which in some instances will provide parallel service to the Metro Support services. Service from Herndon-Monroe will not impact Fairfax County 989 service to the Pentagon because it will be running into downtown Washington. Integration with Fairfax County 980 service into West Falls Church will be required for the service from Herndon-Monroe.

Estimated operations and maintenance costs associated with these Metro Support services are shown in Appendix 1.

Washington Regional Bus Study

Metro Support Routes and Facilities

- Metro Support Terminal Points
- Metro Support Stop
- Metro Support Corridor
- Roads
- Boundaries
- Water



Figure 15 – Metro Support Services Routing

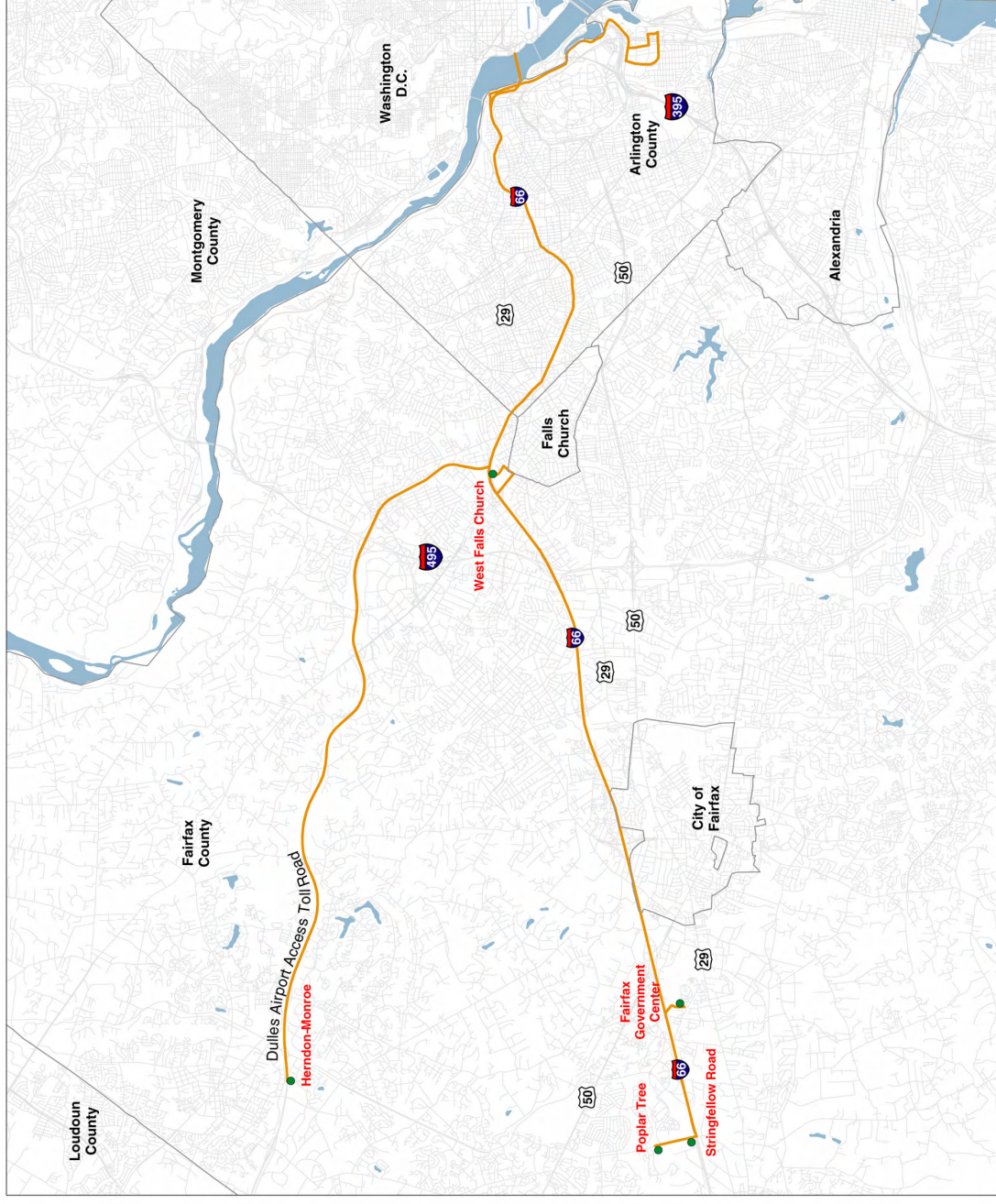
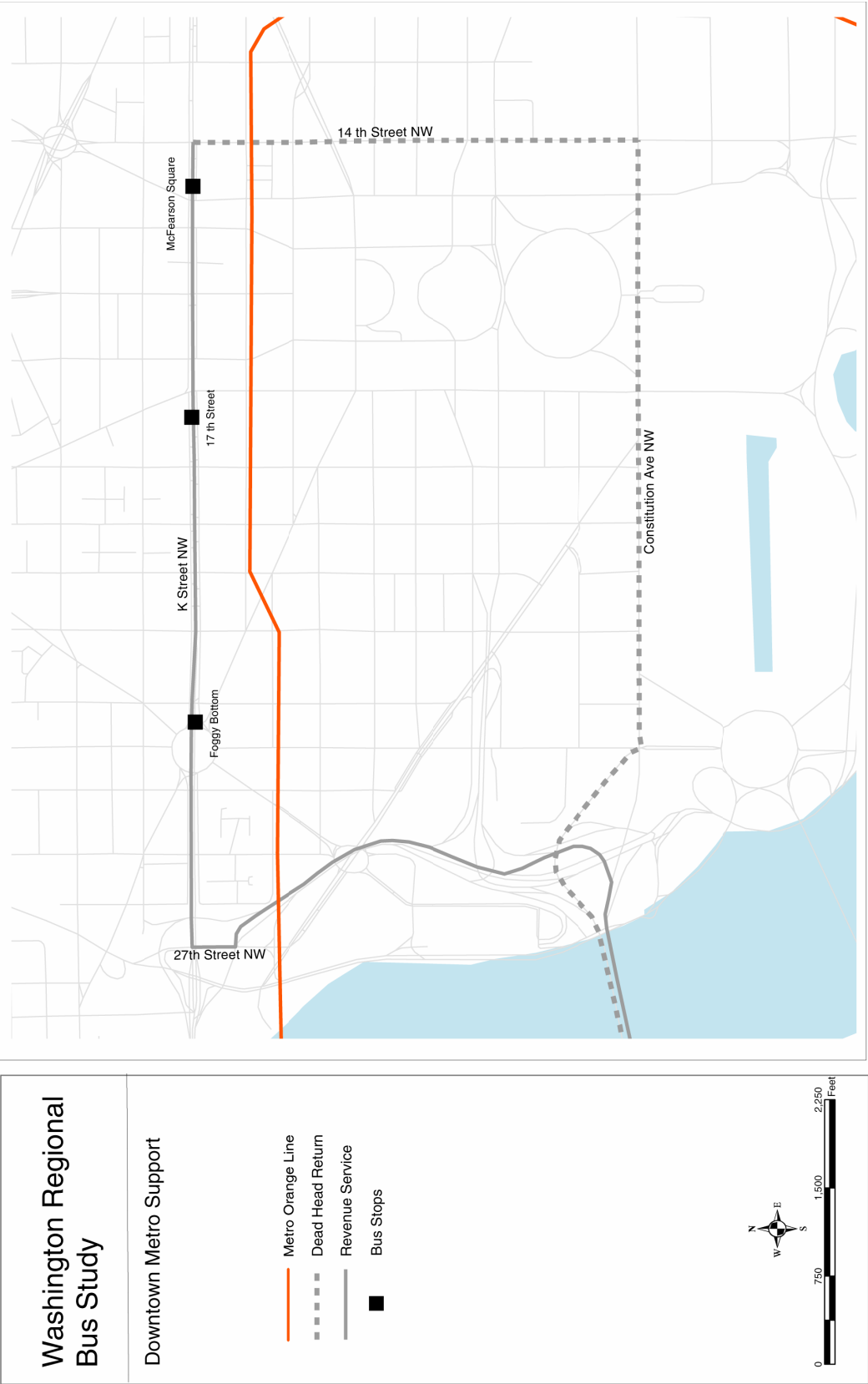


Figure 16 – Metro Support Services – Downtown Routing



B. Running Way and Signal Improvements

- 1. Stringfellow Road Corridor (Poplar Tree and Stringfellow Road Park and Ride Lots)** – The focus of the running way and signal improvements in this corridor are along Stringfellow Road and concentrate on improving access to the HOV entrance to I-66 at the intersection of I-66 and Stringfellow Road. Bus signal priority is recommended at the four signalized intersections along the corridor between the Park and Rides and I-66. These signals exist at: a) the I-66 HOV lane access, b) the Stringfellow Road Park and Ride access, c) Fair Lakes Boulevard, and d) Fair Lakes Parkway. As an alternative to implementation of signal priority at these four signalized intersections, right turn lanes on southbound Stringfellow at Fair Lakes Parkway and the Stringfellow Park and Ride entrance, and on northbound Stringfellow at Fair Lakes Boulevard and Fair Lakes Parkway, could be utilized for bus queue jump or bus bypass lanes. Finally, the existing access into the Poplar Tree Park and Ride is not currently signalized. It is recommended that this intersection be signalized initially for bus access and eventually for auto access to the park and ride facility.

In addition to improvements within the corridor, bus access to the HOV lane entrance to I-66 will be required. It is essential to ensure that this gate is always open during the hours of service.

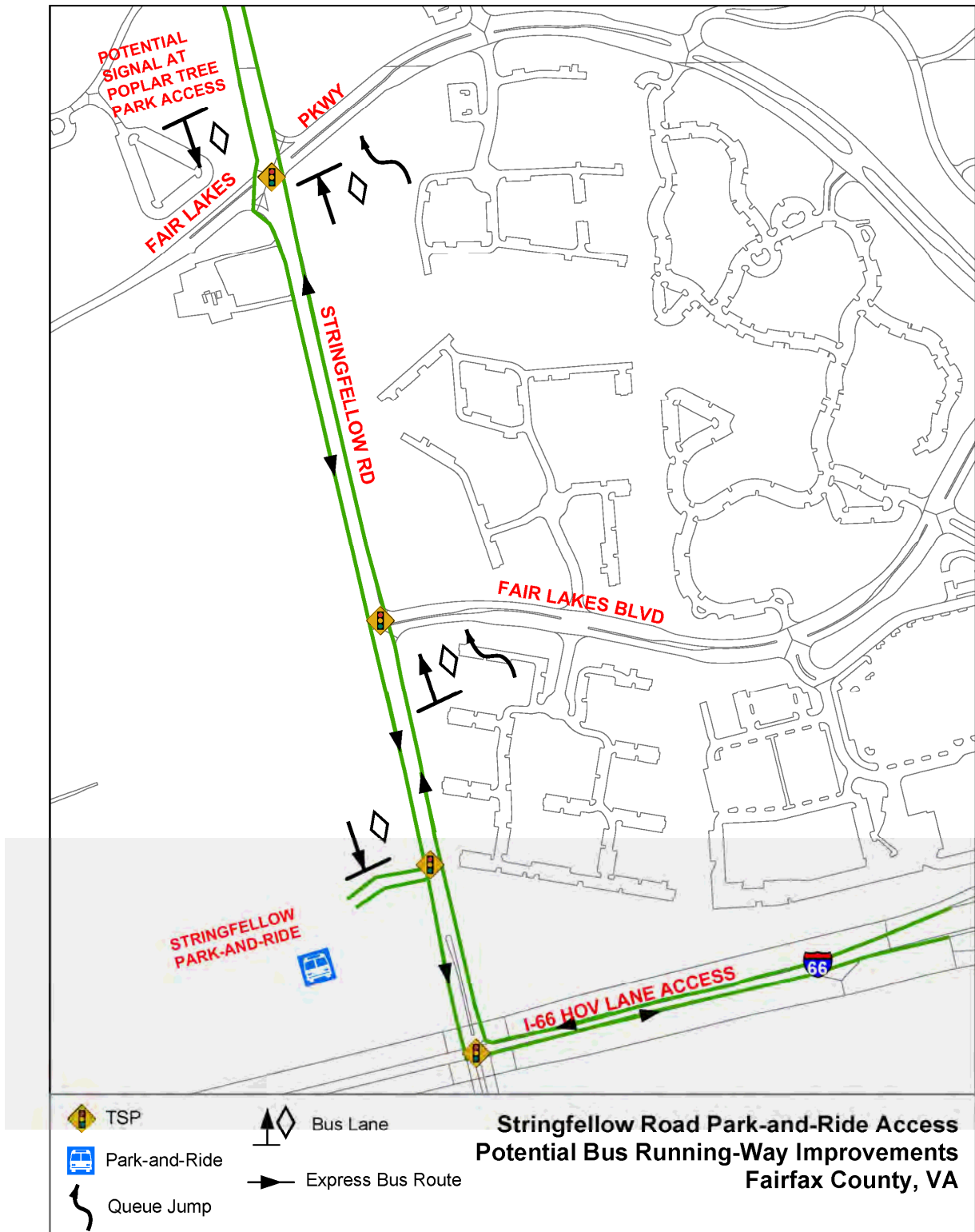
The preliminary recommended running way improvements along Stringfellow Road are shown in Figure 17.

Estimated costs for this program of running way improvements are outlined in Appendix 1.

- 2. Fairfax County Government Center** – The focus of the running way improvements for this park and ride lot is bus preferential treatments between the Park and Ride along Government Center Parkway and the HOV entrance to I-66 at the intersection of I-66 and Monument Drive. Bus signal priority at the following intersections is proposed: a) the westbound left turn from the I-66 HOV access ramp to Monument Drive (for afternoon outbound movements), b) the northbound left turn from Government Center Parkway to Monument Drive (for morning inbound movements) and c) the southbound through movement through the intersection of Post Forest Drive and Government Center Parkway (for outbound movements in the afternoon).

In addition to these signal priority treatments, it is recommended that a bus only left turn lane be developed at the entrance to the Fairfax Government Center along Government Center Parkway (one intersection

Figure 17 – Stringfellow Road Running Way Improvements



south of Post Forest) to reduce the turnaround time for buses to the bus stop along Post Forest.

In addition to improvements along the access path to the I-66 HOV ramp, bus access to the HOV lane entrance will be required. As with the Stringfellow Road ramp, it will be essential to ensure that this gate is open during hours of service.

The recommended improvements for the Fairfax County Government Center Park and Ride are shown in Figure 18.

Estimated costs for this program of running way and signal improvements are outlined in Appendix 1.

3. **West Falls Church** – Inbound buses in the morning will utilize the West Falls Church Metro Station Park and Ride internal roadway system and therefore bus preferential treatments for these trips will not be required. The focus of the improvements, therefore, is to improve access to the park and ride facility for afternoon outbound trips into the station. Two different elements to improve this access are recommended. The first is the implementation of signal priority at three signalized intersections on the access route to the station. These signals/intersections include: 1) the southbound through movement through the signal at the intersection of Leesburg Pike and the I-66 eastbound off ramp, 2) the southbound left turn from Leesburg Pike to Haycock Road, and 3) the eastbound left turn from Haycock Road to the access driveway to the southside intermodal facility at the West Falls Church station.

In addition to signal modifications, it is also recommended that available space on the west side of Leesburg Pike be used to provide a bus only lane for bus bypass through the intersection of Leesburg Pike and the eastbound I-66 off- ramp.

The recommended running way improvements for the West Falls Church Metro Station Park and Ride are shown in Figure 19 (during implementation, WMATA bus planners may want to consider the use of the easternmost entrance into the station to avoid excessive impacts to the townhouses facing on Haycock).

Estimated costs for this program of running way and signal improvements are outlined in Appendix 1.

Figure 18 – Fairfax County Government Center Running Way Improvements

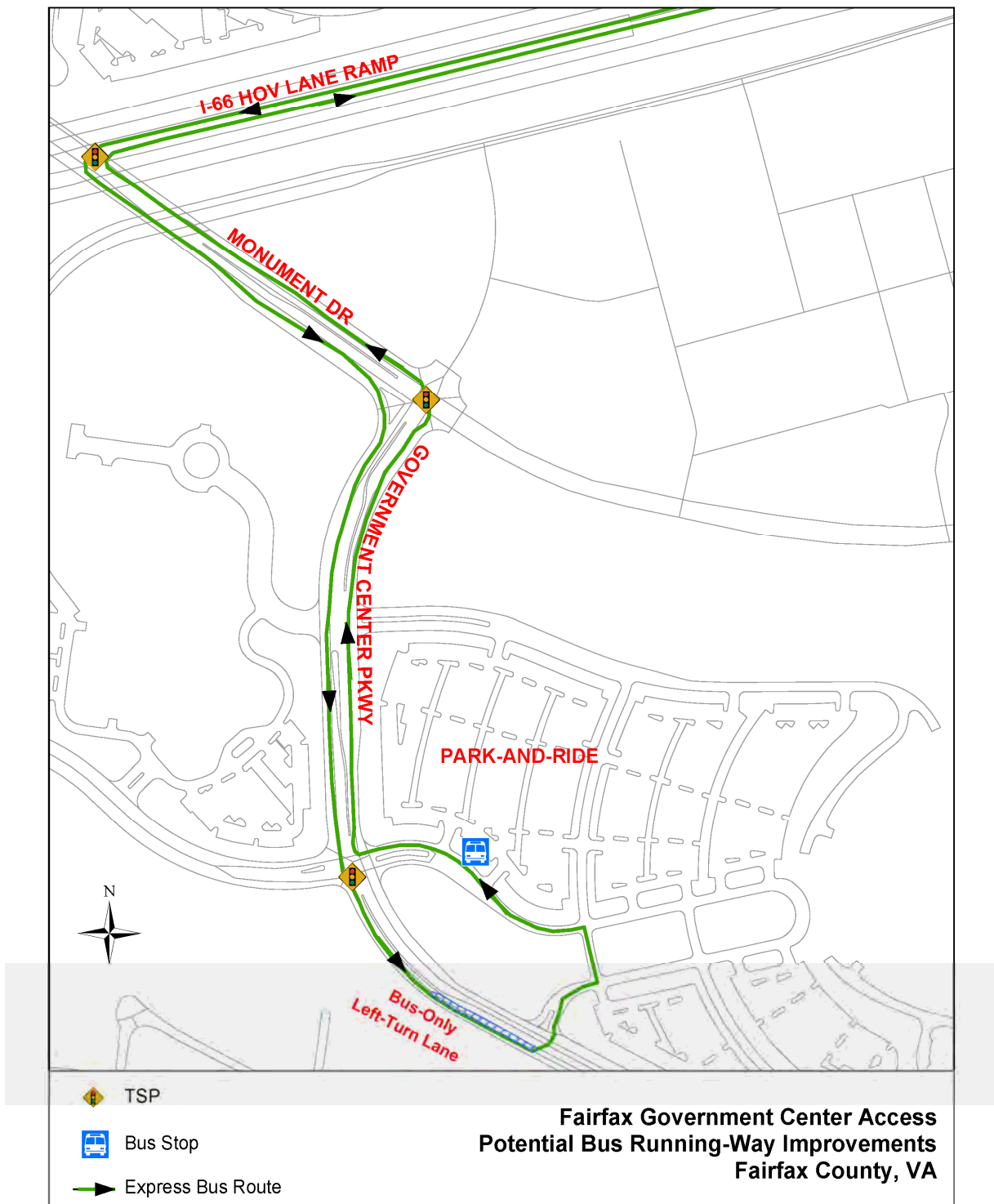
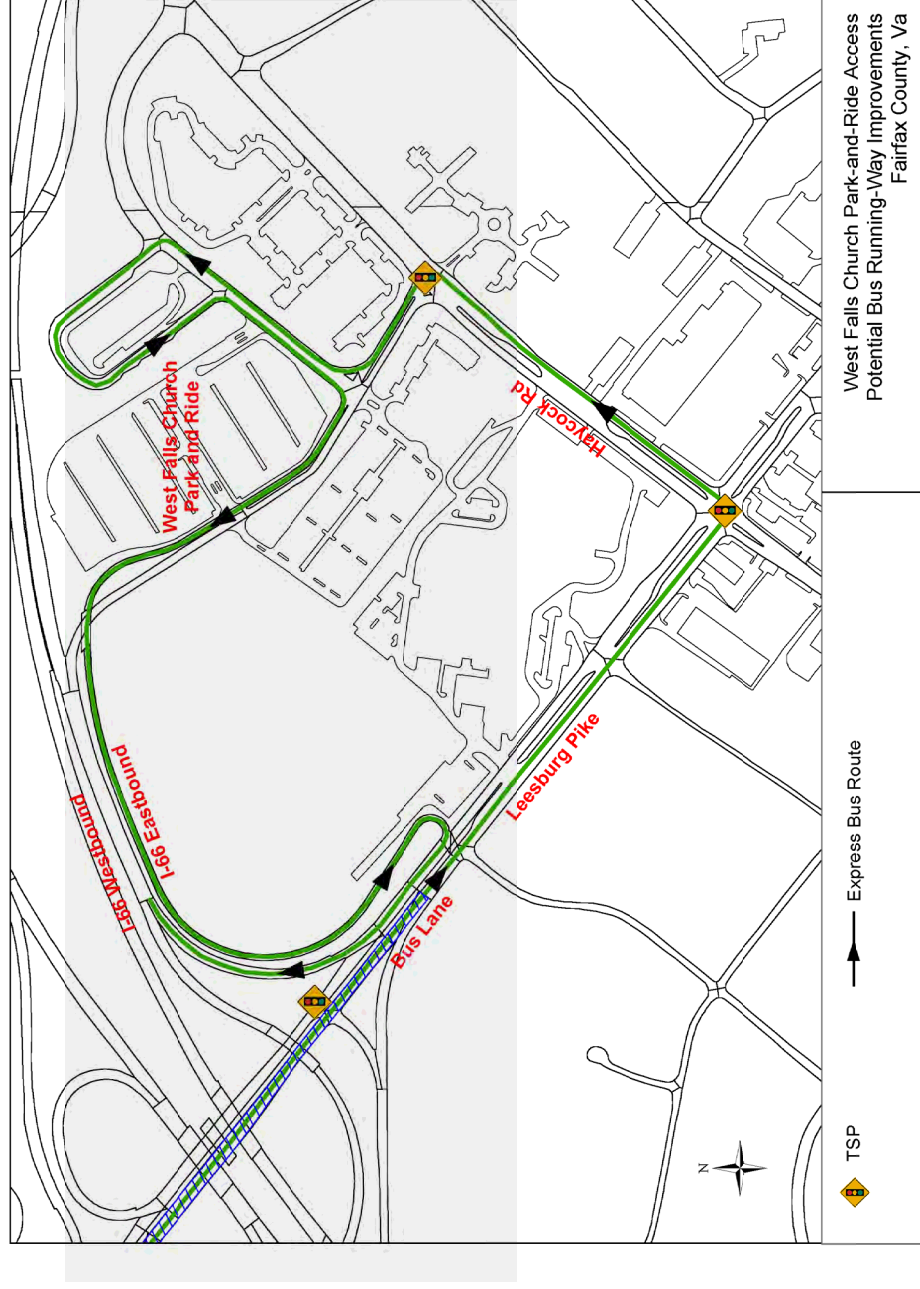


Figure 19 – West Falls Church Running Way Improvements



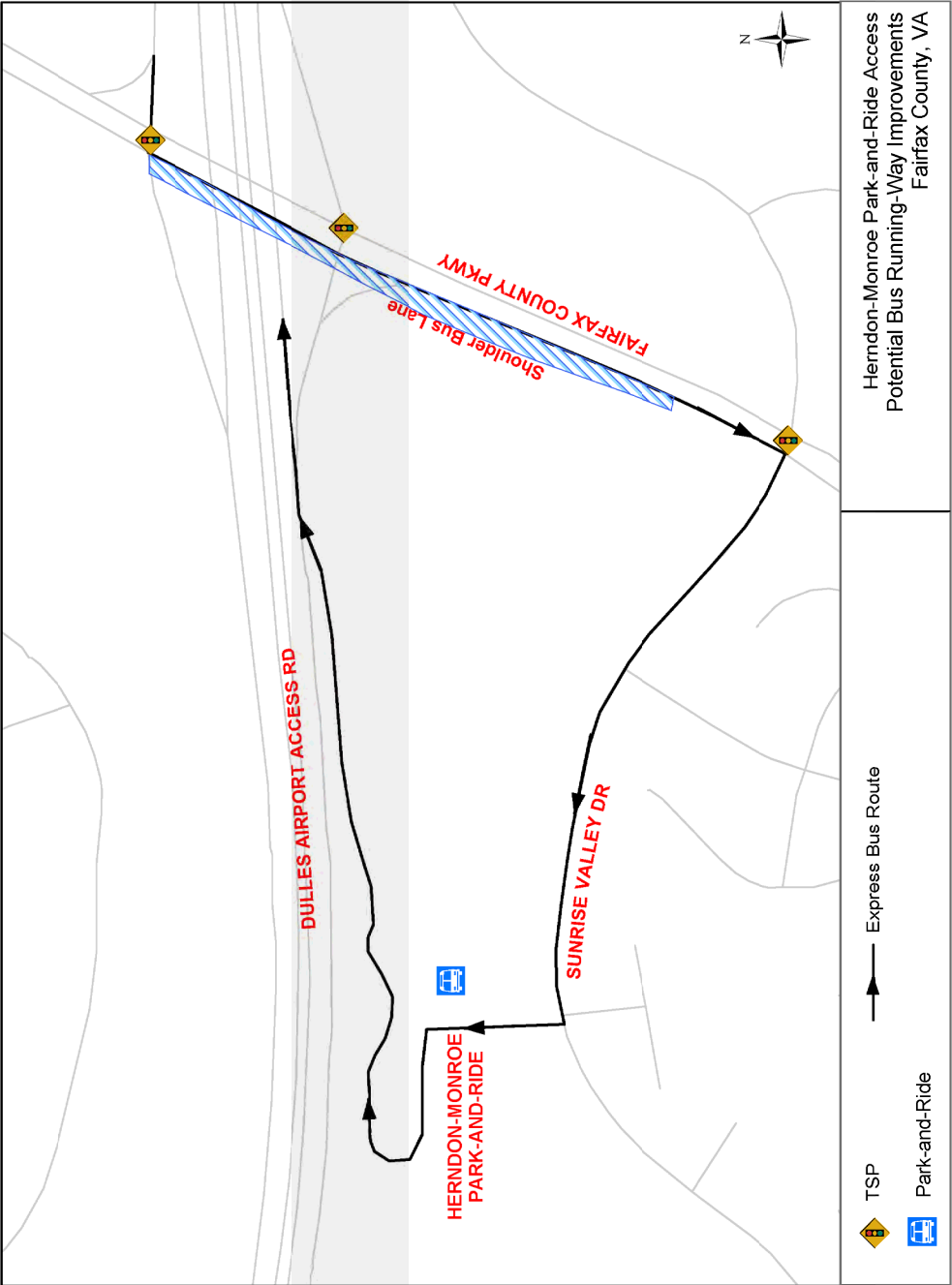
- 4. Herndon-Monroe** – Inbound buses in the morning will have direct access to the Dulles Toll Road via slip ramps from the Herndon-Monroe Park and Ride facility so the focus of the improvements outlined here are for outbound buses in the afternoon that will be required to access the Herndon-Monroe facility via local streets. Bus signal priority is proposed at two signalized intersections on the access route to the facility: 1) left turn priority off the westbound Toll Road off-ramp at Fairfax County Parkway, and 2) southbound through move priority on Fairfax County Parkway at the eastbound Toll Road off-ramp.

In addition to the signal priority treatments, either a shoulder bus lane on the west side of the Fairfax County Parkway from the westbound Toll Road off-ramp to the Sunrise Valley Drive intersection, or extension of the southbound right turn lane at this intersection is also recommended. Either treatment would allow buses to bypass long queues of vehicles along Fairfax County Parkway before turning onto Sunrise Valley Drive, with the extended shoulder bus lane creating the longest bypass condition.

The preliminary recommended improvements for the Herndon-Monroe Park and Ride are shown in Figure 20.

Estimated costs for this program of running way and signal improvements are outlined in Appendix 1.

Figure 20 – Herndon-Monroe Running Way Improvements



5. **Pentagon City/Crystal City** – As noted, one proposed Metro Support express service will run from the Fairfax Government Center to Pentagon City/Crystal City. The proposed routing in the area would be for buses to exit Jefferson Davis Highway onto Army-Navy Drive, turn left onto Hayes Street to serve Pentagon City, and then follow Hayes into the heart of Crystal City via 18th Street. From 18th Street service would turn left onto Crystal Drive and run to 15th Street where it would turn left before entering Jefferson Davis Highway for a return to Fairfax Government Center for a second trip or a return to the garage. In the afternoon, trips would start on Hayes Street in Pentagon City and the run through Crystal City in a routing similar to the morning trip.

Based on this routing signal priority is proposed at the following signalized intersections:

- westbound through movement on Army-Navy Drive at Eads Street;
- westbound through movement on Army-Navy Drive at Fern Street;
- westbound left turn from Army-Navy Drive onto Hayes Street;
- southbound through movement on Hayes Street at 12th Street;
- eastbound through movement at 18th Street at Fern Street; and
- eastbound through movement at 18th Street at Eads Street.

In addition to the signal priority identified above, a bus queue jump in the southbound direction at 15th Street and Hayes Street is recommended to allow buses to pull out of the bus bay area in front of the Pentagon City Fashion Centre with minimal delay. A curb extension along 18th Street in front of the Crystal City Metro station is also proposed where the Crystal City stop for the new service would be located.

Estimated costs for this program of running way improvements are outlined in Appendix 1.

C. *Passenger Facilities*

Each of the Metro Support routes will be operating from existing park and ride lots which, with the exception of the Poplar Tree Park and Ride, currently have at least some existing transit service running from them. The lots with existing transit service also have some passenger facilities already in place. Given this situation, the improvement recommendations outlined in greater detail below focus predominantly on upgrading rider information at each park and ride and along access routes to the park and ride facility, developing a specific Metro Support identity including signage, pavement treatments, and unique shelters that will allow passengers to quickly recognize where the Metro Support routes can be boarded. Improvements will also include providing the necessary

infrastructure for potential off-board fare purchase and Intelligent Transportation Systems. The Poplar Tree Park and Ride will require additional improvements such as bus bays and paved parking to make it suitable for a park and ride based transit service. The passenger facility recommendations for each of the park-and-ride based services are outlined in greater detail below.

- 1. Poplar Tree Park and Ride** – The Poplar Tree Park and Ride is located at the intersection of Melville Lane and Stringfellow Road in the Centreville section of Fairfax County (See Figure 4). The lot is currently unpaved (the lot surface is comprised of gravel) and is adjacent to the Poplar Tree County Park. Field visits to the lot indicated that no cars were parked in the lot at about 10:00 am, meaning the lot is under-utilized as a commuter park and ride. The proposed improvements for the lot are outlined below.

Signage on Access Paths to Parking Lot – Path finder signs similar to signs showing access paths to Metro stations are recommended for key access paths to the facility. It is recommended that these signs incorporate an orange circle or color scheme that underscores the relationship of the bus service to the Orange Line. The proposed location of these signs is shown in Appendix 2. Signs are recommended at the following locations:

- along U.S. Route 50 near the intersection of U.S. Route 50 and Stringfellow Road (both directions)
- along Stringfellow Road at Poplar Tree Road (southbound direction); and
- near the park-and-ride entrance (southbound direction).

The proposed sign would be only a slight modification of the existing Metrorail Station pathfinder sign (the sign would have a MS in the orange circle instead of the M in a circle that is on the Metrorail pathfinder signs) to help, as noted, develop a consistent identity between Metro and the Metro Support services.

New Bus Bays – As noted, the existing Poplar Tree Park and Ride currently has no passenger facilities to support a park and ride based express service. Therefore, the first required passenger facility element is bus bays. Two bays are recommended along the western edge of the facility in an area that now is used as parking spaces for automobiles. A facility site plan is provided in Figure 21.

Shelters and Waiting Areas – No shelters or passenger waiting areas currently exist at Poplar Tree. A shelter with the dimensions 10' x 12' (enough to accommodate 10-11 waiting passengers comfortably) is recommended at each bus bay (each shelter would also have a bench along its back wall). Each bay would also be supported by a waiting area

of approximately 300 square feet, enough to accommodate an additional 25 passengers. The location of these shelters and waiting areas are shown in the site plan. It is proposed that this shelter be consistent in look with the shelters at each Metro Support park and ride in Fairfax County (and eventually with all Metro Support services region wide if the program is expanded regionally). Further, it is recommended that the shelter potentially be designed to provide a connection to Metrorail through an aesthetic that is similar to Metro stations. Each shelter/waiting area would also have a trash receptacle, an outside bench, and pedestrian level lighting.

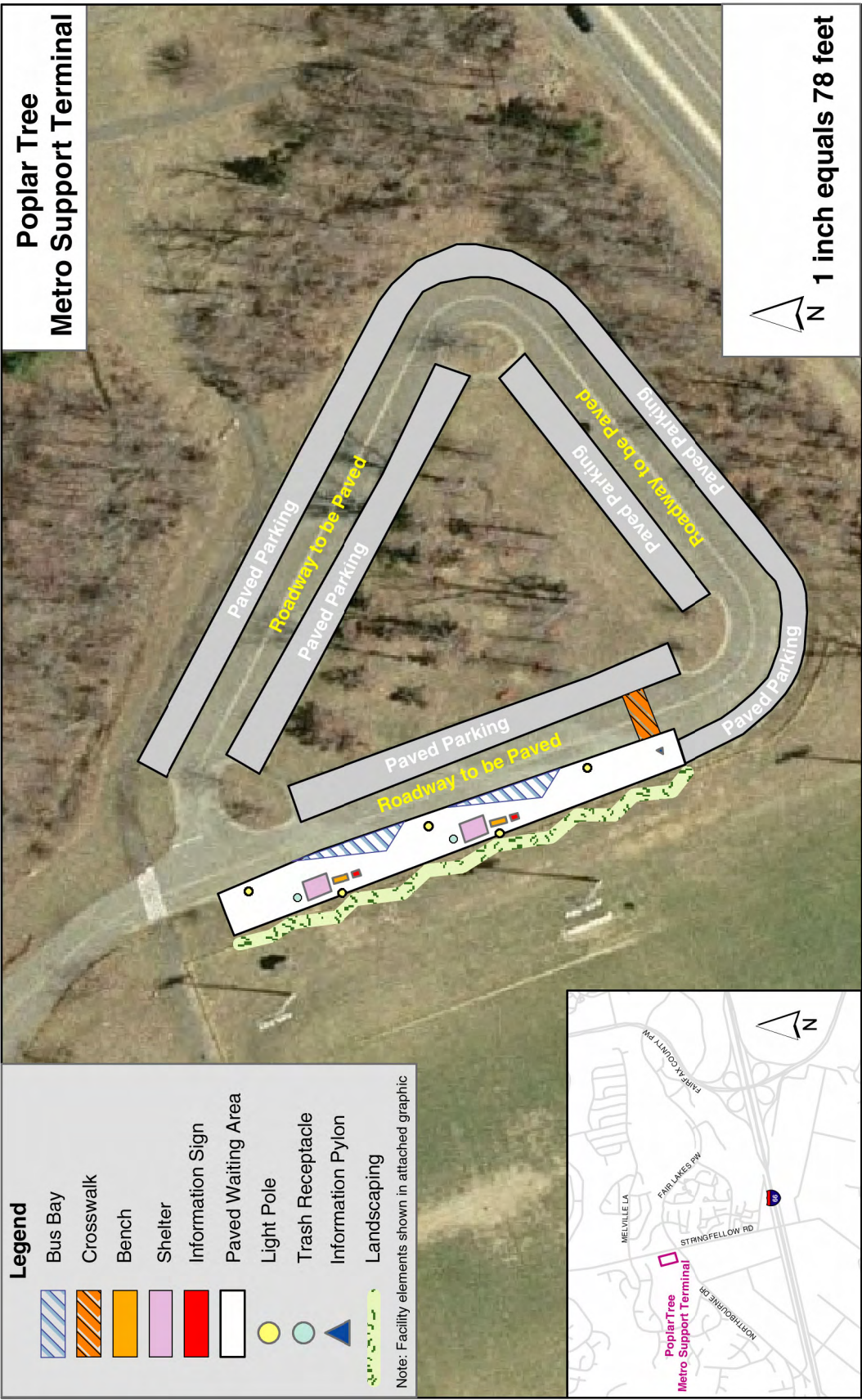
Passenger Information – Passenger information associated with each bus bay will include a map showing the Metro Support route running from the Poplar Tree Park and Ride, including detailed routing in downtown Washington, a detailed schedule showing each departing and arriving trip, and a next bus departure or arrival display that utilizes Intelligent Transportation systems such as Automatic Vehicle Location. A prototype of the information sign is shown in Appendix 3. It is also proposed that a pylon with the park and ride name and the name of the Metro Support service also be located adjacent to the bus bays, in a manner similar to the pylons located at the entrance to existing Metrorail stations. As with the pathfinder signs, the passenger information will be designed such that it has a consistent identity with the overall Metro Support identity.

Paving – To upgrade the Poplar Tree park and ride to standards for park and ride based express services, the vehicle parking area will be paved.

The estimated cost of passenger facility improvements at the Poplar Tree Park and Ride lot are summarized in Appendix 1. Estimated annual maintenance costs, including trash removal, is estimated to be \$7,500.

- 2. Stringfellow Road** – The Stringfellow Road Park and Ride is located approximately two miles south of the Poplar Tree facility along Stringfellow Road, directly adjacent to I-66 (see Figure 4). The lot is currently utilized by the Metrobus 12S service, which runs to the Vienna Metrorail station. The Stringfellow facility consists of a paved parking lot containing about 380 spaces, as well as a bus loop and three bus bays. The entrance to the facility is protected by a traffic signal. The lot is more heavily utilized than the Poplar Tree facility, though it is typically about 50% full during the week. Given the existing passenger facilities at the Stringfellow Road facility, required improvements will be much less extensive than those required at Poplar Tree Park. The site plan showing the proposed improvements is shown in Figure 22.

Figure 21 – Poplar Tree Park and Ride Site Plan



Signage on Access Paths to Parking Lot – Path finder signs similar to the signs described above for the Poplar Tree lot are also proposed for this facility. Signs are recommended for access paths from both the south and north, with the proposed location of these signs shown in Appendix 2. Signs are recommended on U.S. 29/Lee Highway near the intersection of Stringfellow Road and Lee Highway (in both directions), south of I-66 (in the northbound direction) along Stringfellow, at the park and ride entrance (both north and southbound direction along Stringfellow) and south of the Poplar Tree facility (in the southbound direction).

Shelters – Standard plexiglass shelters already exist at the three bays but it is recommended that the shelter at the Metro Support bay be replaced with the shelter described above for the Poplar Tree facility. This new shelter would be consistent with shelters at other Metro Support facilities and would potentially have an aesthetic theme consistent with Metrorail stations.

Passenger Information – As with the Poplar Tree facility, passenger information associated with each bus bay will include a map showing the Metro Support route running from the Stringfellow Road park-and-ride, a next bus departure or arrival display, and a Metro Support pylon.

The estimated cost of passenger facility improvements at the Stringfellow Road Park and Ride lot are summarized in Appendix 1. Estimated annual maintenance costs, including trash removal, is estimated to be \$7,500.

- 3. Fairfax County Government Center** – The Fairfax County Government Center Park and Ride is located off the Government Center entrance road in one of the outer lots of the large number of parking lots that provide parking for County employees and visitors to the Government Center. The lot is currently served by the Fairfax Connector 621 and 623 routes, which provide service to the Vienna Metrorail Station. Existing facilities at the Park and Ride include vehicle parking for 170 cars and a single shelter bus stop along the Government Center entrance road. A site plan of recommended improvements is shown in Figure 23 and summarized below.

Signage on Access Paths to Parking Lot – Path finder signs similar to the signs described above for the Poplar Tree and Stringfellow Road facilities are recommended for the multiple access routes to this facility (map included in Appendix 2). Adjacent to the facility, a pathfinder sign would be located at the intersection of Post Forest Drive and Government Center Parkway (in the westbound direction), and at the intersection of Government Center Parkway and the entrance road to the Government Center (in the eastbound direction). Signs would also be located directly at the entrance to the facility off of both Post Forest and the Government Center entrance Road. Additional signs further from the facility would be located:

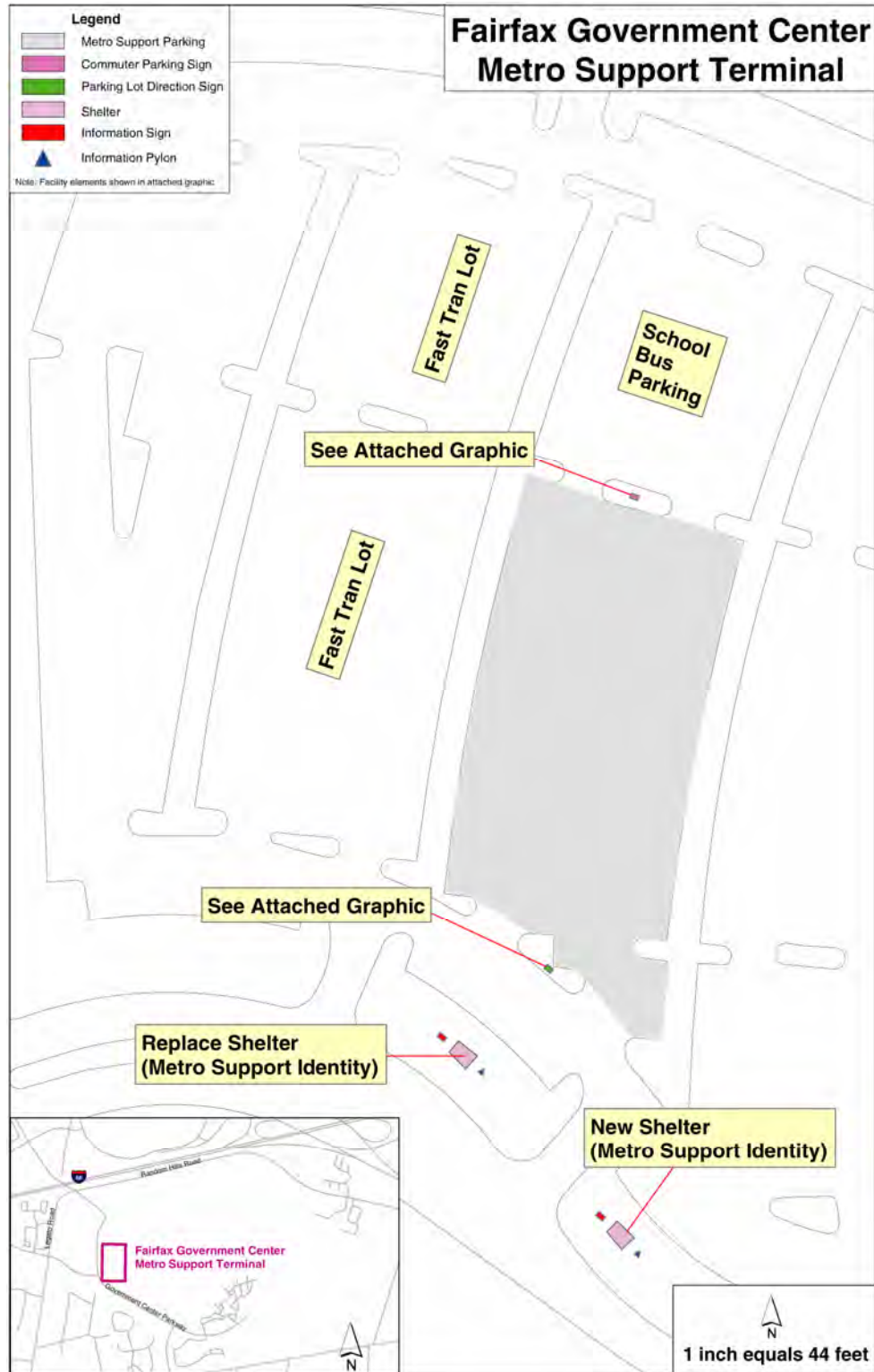
- along Monument Drive at the western intersection of Monument Drive and Government Center Parkway (in both directions);
- along Fair Lakes Parkway (eastbound direction) and along Monument Drive (southbound direction) at the intersection of Monument Drive and Fair Lakes Parkway;
- along West Ox Road (both directions) at the intersection of West Ox and Post Forest Drive;
- along Monument Drive at the eastern intersection of Monument Drive and Government Center Parkway (in the northbound direction); and
- on U.S. 29/Lee Highway (both directions) at the intersection of U.S. 29 and Monument Drive.

Additional Stop – The Fairfax Government Center is the terminal point for two Metro Support services, one to downtown Washington and one to Pentagon City/Crystal City. To handle both services, an additional stop (to the one that already exists) would be required.

Shelters – A standard plexiglass shelter already exists at the on-street bus stop on the Government Center entrance road. It is recommended that this shelter be replaced with the shelter described above for the Poplar Tree and Stringfellow facilities. The second stop would also have a similar shelter.

Passenger Information – As with the other facilities described above, passenger information associated with the Government Center entrance road on-street stops would include a map and schedule of the services running from the facility, a next bus departure or arrival display, and a pylon with the name of the Metro Support Support services operating from the facility.

Figure 23 – Fairfax Government Center Site Plan



Delineation of Parking Facility – The commuter park and ride lot at the Fairfax Government Center is part of a very large complex of parking lots supporting the Government Center. In addition, lots directly adjacent to the park and ride are used for school and paratransit bus storage. Combined, these factors can make finding the lot and deciding which spots can be used for commuter parking, confusing. The pathfinder signs described above will assist in finding the lot, but additional tools to distinguish the lot are also recommended. These include additional signs within the parking facility identifying the facility as Metro Support and a separation of the Metro Support lot from the school bus parking using a curb or grass median. Though often difficult to maintain, painting the pavement of the lot a different color can also help distinguish it from the surrounding facilities.

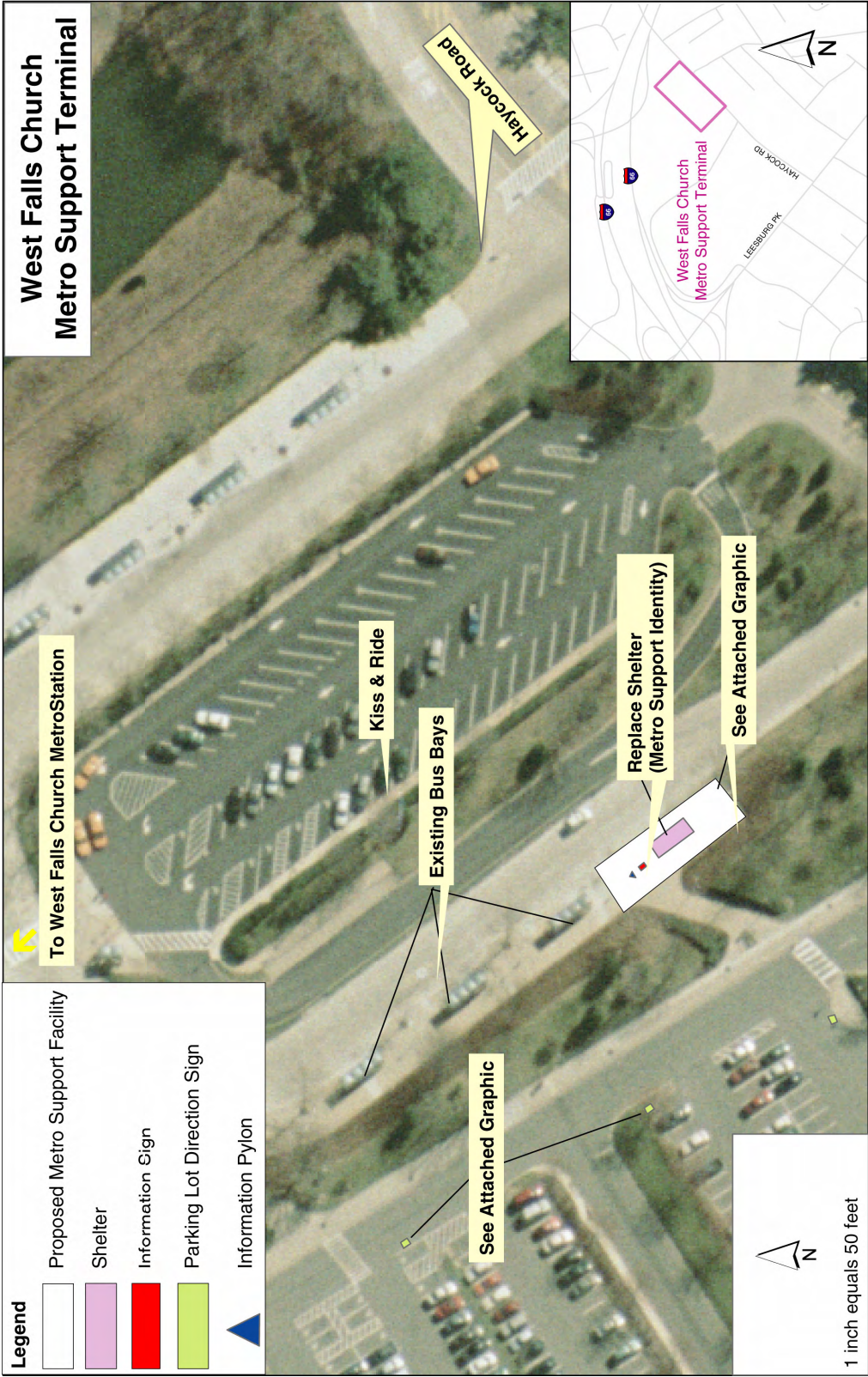
The estimated cost of passenger facility improvements at the Fairfax Government Center Park and Ride lot are summarized in Appendix 1. Estimated annual maintenance costs, including trash removal, is estimated to be \$7,500.

- 4. West Falls Church Metro Station** – The Metro Support services at the West Falls Church Metro station would run from the bus bay facilities on the south side of the station, adjacent to the station parking. The facility would be located at the southernmost bus bay on the west side of the south side bus loop, at an existing bay that is not currently used for other service. Recommended improvements at the facility are outlined below and shown in Figure 24.

Signage on Access Paths to Parking Lot – Path finder signs similar to the signs described above for the other Metro Support lots are recommended for the primary access routes to this facility. Adjacent to the facility, a pathfinder sign would be located on Haycock Road, in both directions, at the entrance to the Metro station. Signs would also be located along Route 7, in both directions at the intersection of Route 7 and Haycock Road. South of the station, signs would be located along Route 7 northbound at West Street and Washington Street. North of the station along Route 7 southbound signs would be located at the intersection with I-66 and at Kings Garden Street. The location of the proposed pathfinder signs is shown in Appendix 2.

Shelters – A standard plexiglass shelter already exists at the bay proposed for the Metro Support service. It is recommended that this shelter be replaced with a shelter with a Metro Support identity similar to that described for the other Metro Support facilities.

Figure 24 – West Falls Church Site Plan



Passenger Information – The passenger information program at this facility would be similar to that described above for other Metro Support facilities. In addition, the program would include signs in the West Falls Church station parking lot directing people to the Metro Support services.

The estimated cost of passenger facility improvements at the West Falls Church Metro Station are summarized in Appendix 1. Estimated annual maintenance costs, including trash removal, is estimated to be \$7,500.

- 5. Herndon-Monroe Park and Ride** - The Metro Support services at the Herndon-Monroe Park and Ride would run from an unused bus bay at the western end of the facility, on the north side of the bus bay island. The facility site plan is shown in Figure 25.

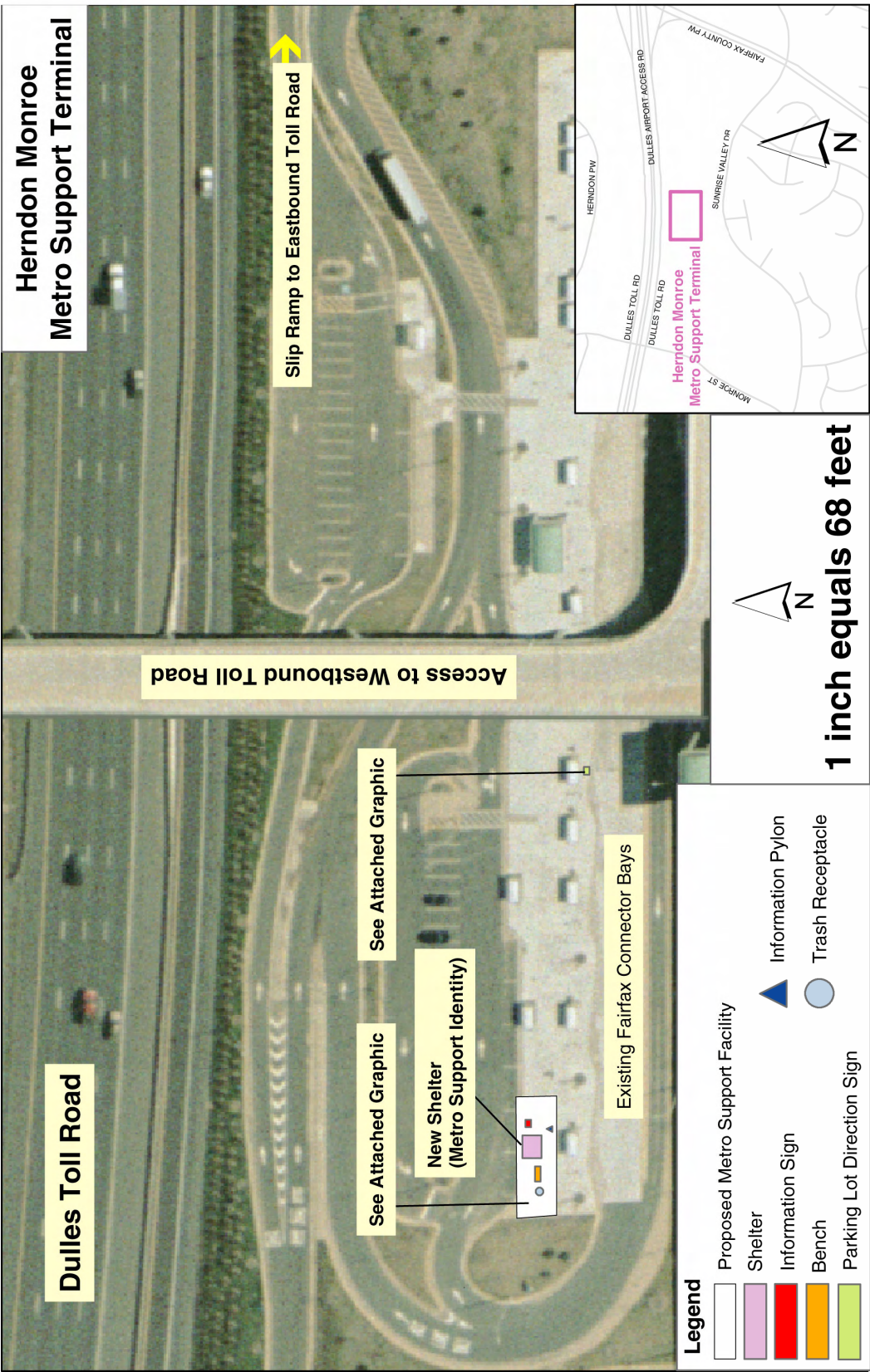
Signage on Access Paths to Parking Lot – Path finder signs similar to the signs described above for the other Metro Support lots are recommended for the primary access path to this facility. Pathfinder signs for the Herndon-Monroe facility would be located along the Fairfax County Parkway in both directions at the intersection with Sunrise Valley Drive, along Sunrise Valley Drive in both directions at the entrance to the Herndon-Monroe Park and Ride, along Monroe Street in both directions at the intersection with Sunrise Valley Drive, and along Centreville Road in both directions at the intersection with Sunrise Valley Drive. The location of the proposed pathfinder signs are shown in Appendix 2.

Shelters – No shelter currently exists at the bay proposed for the Metro Support service at Herndon-Monroe. A shelter with a Metro Support identity similar to that described for the other Metro Support facilities is recommended.

Passenger Information – The same passenger information program identified for the other facilities is also recommended here. Signs would also be located at the crosswalk from the parking garage to the bus bay island at Herndon-Monroe directing people to the Metro Support services.

The estimated cost of passenger facility improvements at Herndon-Monroe are summarized in Appendix 1. Estimated annual maintenance costs, including trash removal, is estimated to be \$7,500.

Figure 25 – Herndon-Monroe Site Plan



Appendix 1-D
Metro Support Routes Capital Costs
Stringfellow Road
(Poplar Tree and Stringfellow P&R)

Stringfellow Road - Signal Priority	
<i>Intersection Location</i>	<i>Cost</i>
I-66 HOV Lane Access (southbound)	\$20,000
Stringfellow Road P&R Access (northbound)	\$20,000
Fair Lakes Boulevard (southbound)	\$20,000
Fair Lakes Parkway (northbound)	\$20,000
Poplar Tree Park and Ride	\$150,000
Total Signal Priority	\$230,000
Bus Bypass/Queue Jump/Exclusive Lane	
<i>Location</i>	<i>Cost</i>
Stringfellow Road P&R Access (southbound queue jump)	\$20,000
Fair Lakes Blvd (northbound queue jump)	\$20,000
Fair Lakes Parkway (queue jump - both directions)	\$75,000
Total Bus Bypass/Queue Jump/Exclusive Lane	\$115,000
Total Stringfellow Road Running Way Improvements	\$345,000

Poplar Tree Park and Ride Lot - Passenger Facility Improvements	
Bus Bays	\$34,500
Waiting Area	\$30,250
Utilities	\$171,120
Bus Roadway	\$237,600
Parking	\$660,000
Shelters	\$10,000
Shelter Bench	\$1,200
Information Sign	\$1,400
Outside Bench	\$2,000
Pedestrian Level Lighting	\$3,150
Trash Receptacle	\$700
Next Bus Arrival Display	\$3,000
Service Name	
Pylon	\$2,000
Total Poplar Tree Passenger Facility Costs	\$1,156,920

Stringfellow Road Park and Ride Lot - Passenger Facility Improvements	
Shelters	\$5,000
Shelter Bench	\$600
Information Signs	\$2,100
Outside Bench	\$1,000
Pedestrian Level Lighting	\$1,575
Trash Receptacle	\$350
Next Bus Arrival Display	\$1,500
Service Name	
Pylon	\$1,000
Total Stringfellow Road Passenger Facility Costs	\$13,125
Total Stringfellow Road Passenger Facility Improvements	\$1,170,045
Total Stringfellow Road Capital Costs	\$1,475,045

Appendix 1-D
Metro Support Routes Capital Costs
Fairfax County Government Center

Fairfax Government Center - Signal Priority	
<i>Intersection Location</i>	<i>Cost</i>
I-66 HOV Lane Access/Monument Drive (northbound)	\$30,000
Government Center Pkwy/Monument Drive (southbound)	\$30,000
Government Center Pkwy/Post Forest (southbound)	\$30,000
Bus Only Left Turn Lane	\$35,000
Total Signal Priority	\$125,000
Total Fairfax Government Center Running Way Improvements	\$125,000

Fairfax Government Center Park and Ride - Passenger Facility Improvements	
Shelters	\$10,000
Shelter Bench	\$1,200
Information Signs	\$2,800
Outside Bench	\$2,000
Pedestrian Level Lighting	\$3,150
Trash Receptacle	\$700
Next Bus Arrival Display	\$3,000
Service Name	
Pylon	\$2,000
Landscaping	\$10,000
Total Govt Center Passenger Facility Costs	\$34,850
Total Fairfax County Government Center Capital Costs	\$159,850

Appendix 1-E
Metro Support Routes Capital Costs
West Falls Church

West Falls Church - Signal Priority	
<i>Intersection Location</i>	<i>Cost</i>
Leesburg Pike/I-66 EB Off-Ramp	\$30,000
Haycock/Leesburg Pike	\$30,000
Haycock to Station Access Road	\$30,000
Total Signal Priority	\$90,000
Bus Bypass/Queue Jump/Exclusive Lane	
<i>Location</i>	
Leesburg Pike Bus Lane	\$75,000
Total Bus Bypass/Queue Jump/Exclusive Lane	\$75,000
Total West Falls Church Running Way Improvements	\$165,000

West Falls Church - Passenger Facility Improvements	
Shelters	\$5,000
Shelter Bench	\$600
Information Signs	\$2,800
Outside Bench	\$1,000
Pedestrian Level Lighting	\$1,575
Trash Receptacle	\$350
Next Bus Arrival Display	\$1,500
Service Name Pylon	\$1,000
Total WFC Passenger Facility Costs	\$13,825
Total West Falls Church Capital Costs	\$178,825

Appendix 1-F
Metro Support Routes Capital Costs
Herndon-Monroe

Herndon-Monroe - Signal Priority	
<i>Intersection Location</i>	<i>Cost</i>
WB Toll Road Off-Ramp (southbound)	\$30,000
EB Toll Road Off-Ramp (southbound)	\$30,000
Total Signal Priority	\$60,000
Bus Bypass/Queue Jump/Exclusive Lane	
<i>Location</i>	
Fairfax County Parkway Shoulder Bus Lane	\$75,000
Total Bus Bypass/Queue Jump/Exclusive Lane	\$75,000
Total Herndon-Monroe Running Way Improvements	\$135,000

Herndon-Monroe - Passenger Facility Improvements	
Shelters	\$5,000
Shelter Bench	\$600
Information Signs	\$2,100
Outside Bench	\$1,000
Pedestrian Level	
Lighting	\$1,575
Trash Receptacle	\$350
Next Bus Arrival Display	\$1,500
Service Name Pylon	\$1,000
Herndon-Monroe Passenger Facility Costs	\$13,125
Total Herndon-Monroe Capital Costs	\$148,125

Appendix 1-G
Metro Support Routes Capital Costs
Pentagon City/Crystal City

Pentagon City/Crystal City - Signal Priority	
<i>Intersection Location</i>	<i>Cost</i>
Army-Navy and Eads (westbound)	\$30,000
Army-Navy and Fern(westbound)	\$30,000
Army-Navy and Hayes (westbound)	\$30,000
Hayes Street and 12th Street (southbound)	\$30,000
18th Street and Fern (eastbound)	\$30,000
18th Street and Eads (eastbound)	\$30,000
Total Signal Priority	\$180,000
Bus Bypass/Queue Jump/Exclusive Lane	
<i>Location</i>	
Hayes Street and 15th Street (Queue Jump)	\$30,000
18th and Metro Station (curb extension)	\$20,000
Total Bus Bypass/Queue Jump/Exclusive Lane	\$50,000
Total Pentagon/Crystal City Running Way Improvements	\$230,000

Appendix 1-H
Metro Support Vehicle Costs and O&M Costs

Metro Support Peak Vehicle Requirements

Route	Peak Vehicles	Fleet
Herndon-Monroe	14	16
West Falls Church	11	13
Fairfax GC to Downtown	11	13
Fairfax GC to Crystal City	8	9
Stringfellow Road	12	14
Poplar Tree	12	14
Total	68	79
Per Vehicle Cost		\$375,000
Total Vehicle Costs		\$29.63 million

Metro Support Daily and Annual O&M Costs

Metro Support Services	
Cost Per Platform Hour	\$70.92
Daily Platform Hours	400
Daily Operating Cost	\$28,300
Annual Operating Cost	\$7,085,000

Metro Support Daily and Annual O&M Costs – by Route

Route	Weekday Platform Hours	Weekday Cost	Annual Cost
Fairfax Gov't Center to DT	66	\$4,680	\$1,117,000
Stringfellow Road to DT	69	\$4,890	\$1,220,000
Poplar Tree P&R to DT	69	\$4,890	\$1,220,000
Herndon-Monroe to DT	82	\$5,800	\$1,450,000
West Falls Church to DT	66	\$4,680	\$1,170,000
Fairfax Gov't Center to Crystal City	48	\$3,400	\$850,000